VERY IMPORTANT

As the booklet is constantly re-edited, this one only covers vehicles for this particular model year.

It is therefore necessary to order a new booklet each year and RETAIN THE OLD ONES.

CITROËN

PRIVATE CARS

PRIVATE CARS

CITROËN C1

«The technical information contained in this document is intended for the exclusive use of the trained personnel of the motor vehicle repair trade. In some instances, this information could concern the security and safety of the vehicle. The information is to be used by the professional vehicle repairers for whom it is intended and they alone would assume full responsibility to the exclusion of that of the manufacturer».
«The technical information appearing in this brochure is subject to updating as the characteristics of each model in the range evolve. Motor vehicle repairers are invited to contact the CITROËN network periodically for further information and to obtain any possible updates».

2005

AC/QCAV/MTD
Méthodes techniques documentation

© «The intellectual property rights relating to the technical information contained in this document belong exclusively to the manufacturer. Reproduction, translation or distribution in whole or in part without prior written authorisation from the manufacturer is forbidden».

2005

CAR 000 022

PRESENTATION

THIS HANDBOOK summarises the specifications, adjustments, checks and special features concerning **CITROËN C1**.

The handbook is divided into groups representing the main functions :

GENERAL - ENGINE - INJECTION - IGNITION - CLUTCH, GEARBOX, DRIVESHAFTS - AXLES, SUSPENSION, STEERING - BRAKES - AIR CONDITIONING.

IMPORTANT

If you find that this handbook does not always meet your requirements, **we invite you to send us your suggestions** which we will take into account when preparing future publications. For example :

- INSUFFICIENT INFORMATION
- SUPERFLUOUS INFORMATION
- NEED FOR MORE DETAILS

Please send your comments and suggestions to :

CITROEN U.K. Ltd.
221, Bath Road,
SLOUGH,
SL1 4BA.
U.K.

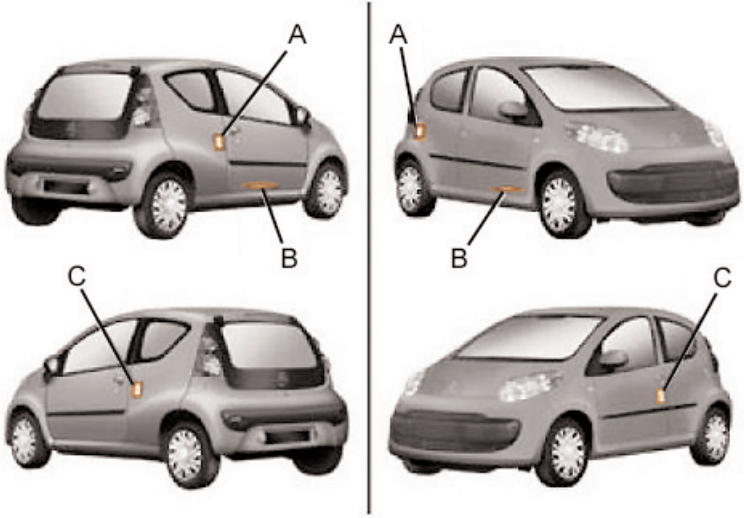
CONTENTS

GENERAL	
Vehicle identification	1 - 4
Specifications & dimensions	5 - 6
Weight specifications	7
Operations to be performed following	8
Towing specifications	9 - 12
Lifting and supporting the vehicle	13 - 15
Capacities	16 - 17
Lubrication system	18
Lubricants	19 - 21
ENGINES	
Specifications	22
Presentation of CFA engine	23 - 32
Tightening torques on CFA engine	33 - 37
Tightening torques on 8HT engine	38 - 41
Tightening torques : cylinder head : all types	42
Auxiliary drive belt	44
Checking and setting the valve timing	51
Exhaust specifications	78 - 82
Cooling system specifications	83 - 86
Checking the oil pressure	87
Valve clearances	88
Draining, filling and bleeding the cooling circuit	89 - 92
INJECTION	
BOSCH ME 7.9.5 injection	93 - 105
Air filter on CFA engine	106
Fuel supply system	107 - 110
Injectors	111
Safety requirements : HDi direct injection	112 - 113
Prohibited operations : HDi direct injection	114 - 115
Pre-postheating system	116
Checking the low pressure fuel supply circuit	117 - 118
Checking turbo pressure	119 - 121
Air supply circuit	122 - 124
IGNITION	
Sparking plugs	125
CLUTCH-GEARBOX-TRANSMISSION	
Clutch specifications	127
Tightening torques : clutch	128
Checking and adusting clutch pedal travel	129 - 130
Specifications : MT (TOYOTA) manual gearbox	131 - 132
Tightening torques : MT (TOYOTA) manual gearbox	133 - 136
Recommendations - precautions : MMT piloted manual gearbox	137 - 140
Specifications : MMT piloted manual gearbox	141 - 144
Tightening torques : MMT piloted manual gearbox	145 - 147
Driveshafts	148

CONTENTS

AXLES-SUSPENSION-STEERING	
Wheels and tyres	**149**
Axle geometry	**150 - 152**
Front axle	**153 - 154**
Tightening torques: front axle	**155**
Rear axle	**156**
Tightening torques : rear axle	**157**
Suspension	**158**
Tightening torques: suspension	**159 - 160**
Manual steering	**161**
Power steering	**162 - 163**
Setting the steering rack mid-point	**165**
BRAKES	
Brake specifications	**166 - 168**
Tightening torques: brakes	**169 - 171**
Checking the brake pedal	**172 - 174**
Checking the braking amplifier	**175 - 176**
Checking the vacuum pump	**177 - 178**
Adjusting the handbrake	**179**
Draining, filling, bleeding the braking	**180 - 183**
AIR CONDITIONING	
R134.a capacity	**184**
Air conditioning circuit	**185 - 186**
Pollen filter	**187**
Filtering cartridge	**188 - 189**
Aircon circuit : CFA engine	**190**
Aircon circuit : 8HT engine	**191**

IDENTIFICATION OF VEHICLES



E1A2004D

A - Manufacturer's plate
(On the centre pillar : 3-door version)
(On the rear door aperture : 5-door version)

A - AS/RP No. and RP paint code.

B - Chassis stamp
(Cold stamp on the crossmember, under the front RH seat).

C - Tyre pressures and tyre type
(Label on the front pillar on driver's side).

IDENTIFICATION OF VEHICLES

Type approval

Structure

PN CFAC/T	P	Family **(1)**
	N	Bodywork **(2)**
	CFA	Engine **(3)**
	C	Version **(4)**
	T	Variant **(5)**

Family (1)

P	C1

Body shape (2)

M	3-door saloon (4 seats)
N	5-door saloon (4 seats)

Engine (3)

CFA	1.0i	384F/E4
8HT	1.4 HDi	DV4TD/E4

Version (Depollution gearbox) (4)

	Gearbox	Depollution
V	5-speed gearbox	E5
C		E4

Variants (5)

IF	Fiscal incentives
T	Entreprise van-convertible
P	Piloted manual gearbox

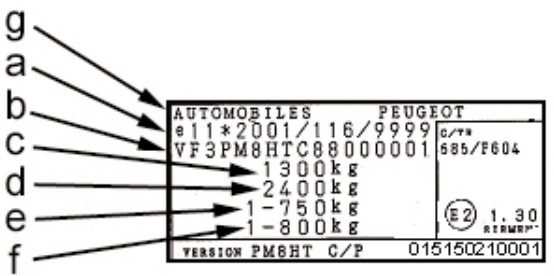
IDENTIFICATION OF VEHICLES

	Petrol		Diesel
	1.0i		1.4 HDi
Emission standard	E4		
Type code	PN CFAC		PN 8HTC
Engine type	CFA		8HT
Cubic capacity (cc)	1.0i		1.4 HDi
Fiscal rating (hp)	4		3
Gearbox type	MT	MMT	MMT
Gearbox ident. plate	C 551 (m) **(*)**	C 551A (mp) **(**)**	C 552 (m) **(*)**

(*) = Manual gearbox
(**) = Piloted manual gearbox

IDENTIFICATION OF VEHICLES

Manufacturer's plate.



E1A2002D

The manufacturer's plate carries the following information :

(a) Type approval number (*).

(b) Type serial number (VIN).

(c) Gross vehicle weight (*).

(d) Gross vehicle weight (*).

(e) Maximum weight on front axle (*).

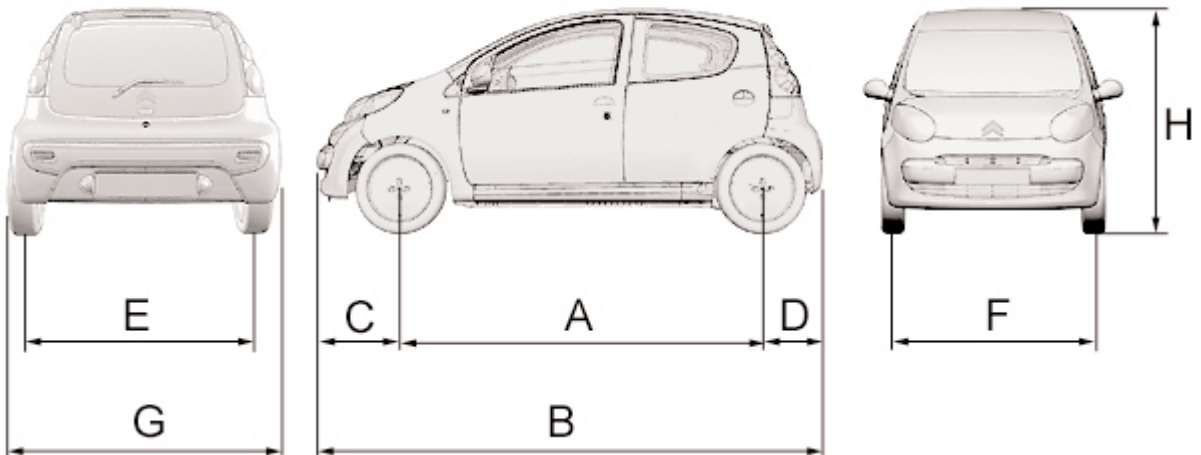
(f) Maximum weight on rear axle (*).

(g) Manufacturer identification.

(*) = according to marketing country

GENERAL SPECIFICATION : DIMENSIONS

Exterior dimensions (mm)



E1A2001D

GENERAL SPECIFICATION : DIMENSIONS

Exterior dimensions (mm)

Vehicles		All types
Wheelbase	A	2340
Length overall	B	3429
Front overhang	C	653
Rear overhang	D	436
Rear track at ground level	E	1410
Front track at ground level	F	1420
Width overall *	G	1630
Height overall *	H	1460
Height with longitudinal roof bars		

ODM = Vehicle in running order *(vehicle empty, levels topped up)*.

Interior dimensions and volumes (mm)

	3-door version	5-door version
Elbow width, front	1379	1377
Elbow width, rear	1336	1358
Boot		
Height of boot below shelf (between boot carpet and parcel shelf)	436	
Minimum floor width	510	
Volume of boot below parcel shelf (dm^3)	199	

GENERAL SPECIFICATION : WEIGHTS

	3-door			5-door		
	Petrol		Diesel	Petrol		Diesel
	1.0i		1.4 HDi	1.0i		1.4 HDi
Engine type	384F E4		DV4TD E4	384F E4		DV4TD E4
Gearbox type	C551	C551A	C552	C551	C551A	C552
Payload	370	355	355	370	355	355
Weight empty in running order	790	825	880	800	835	890
Gross Vehicle weight	1160	1180	1235	1170	1190	1245
Gross Train weight	1160	1180	1235	1170	1190	1245
Max. trailer weight with brakes : 8% incline						
Max. trailer weight with brakes : 10% incline						
Max. trailer weight with brakes : 12% incline						
Max. trailer weight without brakes						
Maximum nose weight						
Maximum weight on roof bars (kg)	50					

OPERATION TO BE CARRIED OUT FOLLOWING A RECONNECTION OF THE BATTERY

Radio

Before disconnecting the battery, make a note of the customer’s rado stations.

After reconnecting the battery, reprogramme the radio stations.

GENERAL SPECIFICATION : TOWING THE VEHICLE

Vehicle towing

Towing eye

E2A200CD

E2A200DD

WARNING : When the engine is not running, steering and braking are no longer power-assisted.

The towing eye **(1)** is to be found in the vehicle toolkit.

NOTE : The vehicle toolkit is stowed in the boot

GENERAL SPECIFICATION : TOWING THE VEHICLE

Vehicle towing : Precautions to be taken

Manual gearbox	Piloted manual gearbox
ESSENTIAL : Never tow the vehicles with wheels hanging *(towing by the wheels)*.	**Vehicle equipped with a piloted manual gearbox** **IMPERATIVE : It is necessary to lift the front of the vehicle in order to tow it, having placed the gear selector in neutral.** **If there is a gearbox malfunction or fault, the vehicle may remain immobilised depending on the seriousness of the fault.** **If a gear is engaged, the conditions for immobilisation of the vehicle may be :** - engine stopped (no starting) - clutch open (clutched) **IMPERATIVE : If a gear is engaged and it is impossible to disengage it, it is compulsory to tow the vehicle with the front wheels lifted.** **If it not possible to lift the front of the vehicle, there is more than one way of unjamming the gearbox :** - engaging **"N"** with the aid of a diagnostic tool - engaging **"N"** without the aid of a diagnostic tool

GENERAL SPECIFICATION : TOWING THE VEHICLE

Vehicle towing : Precautions to be taken

Piloted manual gearbox

Engaging "N" with the aid of a diagnostic tool

Preliminary operations :
- Vehicle stationary, engine stopped
- Battery voltage higher than **12.5 volts**
- Ignition switched on
- Gear selector on position **"N"**

Connect the diagnostic tool to the vehicle's diagnostic socket.
Using the diagnostic tool menus, select :
- "DIAGNOSIS"
- **MMT** piloted manual gearbox
- Actuator tests
- Gearbox actuator test
- Engaging Neutral

NOTE : The letter **"N"** should appear in the instrument panel. If not, see the following solution : engage **"N"**; without the help of a diagnostic tool.

Engaging "N" without the aid of a diagnostic tool

In this configuration, the gearbox actuator is jammed, gear engaged.

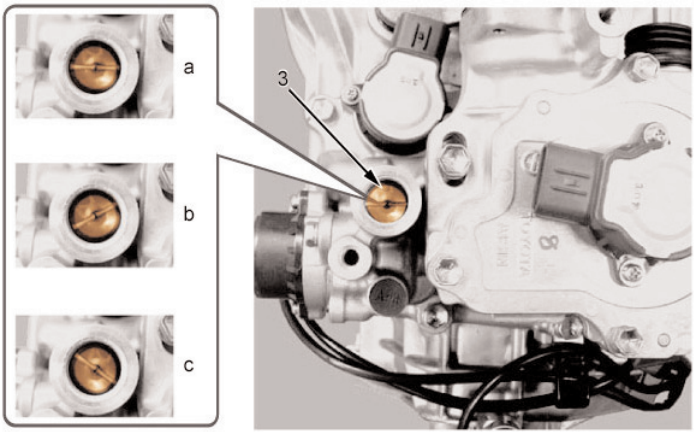
IMPERATIVE : This emergency solution is to be used only where the above solutions for setting the gearbox actuators using the diagnostic tool have failed (destruction of the gearbox actuator).
Preliminary operations:

Disconnect the negative terminal of the battery.
Remove the blank on the gearbox actuator

GENERAL SPECIFICATION : TOWING THE VEHICLE

Vehicle towing : Precautions to be taken

Piloted manual gearbox



B2C201TD

"a" Neutral.
"b" 1st, 3rd, 5th.
"c" 2nd, 4th, reverse gear.

Using a large screwdriver, move the screw **(3)** to bring the gearbox actuator to the neutral position.

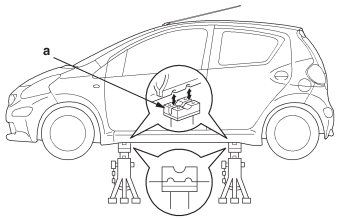
When this position is reached, **"N"** is engaged.

Driving

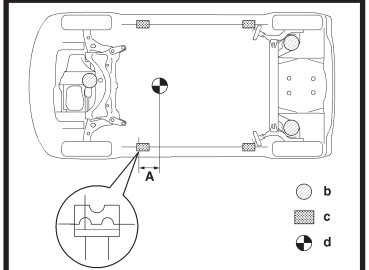
IMPERATIVE : Never drive with the ignition switched off. Never push the vehicle to attempt to start it *(impossible with a piloted manual gearbox).*

GENERAL SPECIFICATION : LIFTING AND SUPPORTING THE VEHICLE

Lifting and supporting the vehicle



E2A2000D



E2A2001D

Note on status of the vehicle before lifting
The vehicle should be unloaded before any lifting operation. Never place a loaded vehicle on a jack or on a lift.
When you remove a heavy component, such as the engine or the gearbox, the vehicle's centre of gravity moves.

Note on use of a 4-column lift
Respect the safety requirements set out in the user instructions.
Immobilise the vehicle with wheel locks.

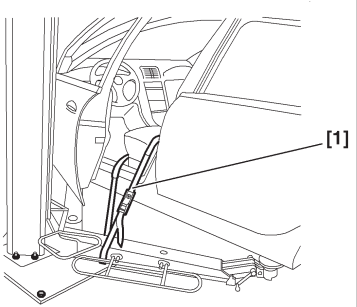
Note on use of jacks and axle stands
Work on a flat surface and always use wheel blocks.
Use axle stands with rubber blocks **"a"**, as indicated.
Place the jack and the axle stands on the prescribed lifting points on the vehicle. Do not use the jack without axle stands.
To raise the front wheels, release the parking brake and place blocks at the rear of the rear wheels only. To raise the rear wheels, place blocks at the front of the front wheels only.
To raise the front wheels only, or the rear wheels only, place blocks on either side of the wheels that are in contact with the ground.
To relower a vehicle raised at the front, release the parking brake and place blocks at the front of the rear wheels only. To relower a vehicle raised at the rear, place blocks at the rear of the front wheels only.

"b" : jacking point.
"c" : pantograph jacking point lugs.
"d" : centre of gravity of the vehicle (excluding load).
A :

3-door	: OFFSET **331 mm**	LEVEL **1370 mm**
5-door	: OFFSET **349 mm**	LEVEL **1387 mm**

GENERAL SPECIFICATION : LIFTING AND SUPPORTING THE VEHICLE

Lifting and supporting the vehicle



E2A200BD

Note on use of a 4-point lift with moving arms

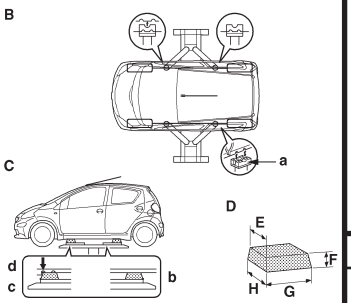
IMPERATIVE : Position the safety straps, if placing the vehicle on a lift supported from the jacking points *(risk of the vehicle overbalancing when a heavy component is removed).*
Equip the moving arms with rubber blocks as indicated.
To use this lift, align the middle of it as far as possible with the centre of gravity of vehicle.
Present the vehicle as far as possible in the axis of the moving arms. Adjust the moving arms to the vehicle's jacking points.

WARNING : Do not raise the vehicle too high, to avoid all risk of instability.
Lock the moving arms while the repairs are being carried out.
Raise the vehicle just off the ground and check that it is stable.

Example :
2-column lift
Place the safety straps **[1]** under the lift arm and criss-crossing the vehicle

GENERAL SPECIFICATION : LIFTING AND SUPPORTING THE VEHICLE

Lifting and supporting the vehicle



E2A2002D

Note on use of a platform lift

Respect the safety requirements set out in the user instructions.
Use blocks for a platform lift.

B : lift with moving arms.
C : platform lift.

"a" rubber block

Dimensions of block **D** :

"e"	**: 85 mm**
"f"	**: 70 mm**
"g"	**: 200 mm**
"h"	**: 100 mm**

Use the following table in order to position the vehicle correctly

Right/left adjustment	Place the vehicle in the middle of the lift
Front/rear adjustment	Align the bottom of the blocks on the extreme edges of the platform rubber «**i**» and «**j**»
	Align the top of the blocks on one of the blocks «**k**» on the front jacking point lug.

Raise the vehicle just off the ground and check that it is stable.

CAPACITIES (in litres)

Draining methods.

Oil capacities are defined according to the following methods.

Draining of the engine lubrication system by **GRAVITY**	Draining of the engine lubrication system by **SUCTION**.
Place the vehicle on horizontal ground *(in the high position if hydro-pneumatic suspension).*	Place the vehicle on horizontal ground *(in the high position if hydro-pneumatic suspension).*
The engine should be hot *(oil temperature **80° C**).*	The engine should be hot *(oil temperature **80° C**).*
Drain the sump by gravity	Remove the oil by suction through the dipstick tube.
Remove the oil filter cartridge *(time for draining and drip-drip = **15 minutes** approx.).*	Remove the oil filter cartridge.
Refit the cap with a new seal	Maintain the suction of oil in the sump *(**15 minutes** approx.).*
Refit a new oil filter cartridge	Refit a new oil filter cartridge
Refill the engine with oil *(see table for oil capacity).*	Refill the engine with oil *(see table for oil capacity).*
Start the engine to fill the oil filter cartridge.	Start the engine to fill the oil filter cartridge.
Stop the engine *(allow to stabilise for **5 minutes**).*	Stop the engine *(allow to stabilise for **5 minutes**).*
	WARNING : Remove the suction container before starting the engine

ESSENTIAL : Systematically check the oil level using the oil dipstick.

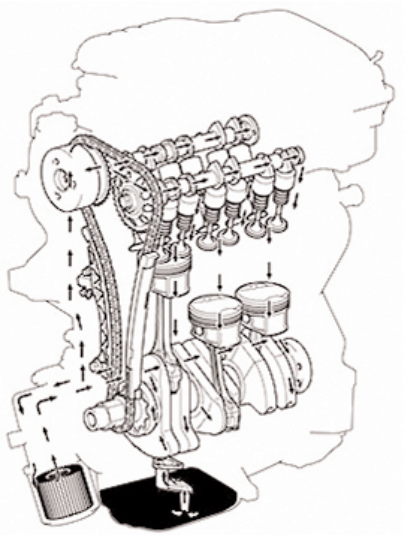
CAPACITIES (in litres)

	Petrol	Diesel
	1.0i	1.4 HDi
Engine plate	CFA	8HT
Draining by gravity : engine with filter change	3,1	3,75
Between min. and max.	1	1,8
MT 5-speed gearbox	1.7	
MMT piloted 5-speed gearbox		
Braking circuit		
Cooling system	4	4,4
Fuel tank capacity	35	

ESSENTIAL : Systematically check the oil level using the oil dipstick.

LUBRICATION CIRCUIT SPECIFICATIONS

Engine : CFA



B1B202CD

Lubrication system

The lubrication circuit is fully pressurised and all of the oil passes through the oil filter.

The rotary oil pump (**30**) is driven directly by the crankshaft.

Oil capacity (in litres)

With oil filter	**: 3,1**
Without oil filter	**: 2,9**

RECOMMENDED LUBRICANTS

	Engine oil					
	TOTAL ACTIVA or TOTAL ACTIVA QUARTZ					
Commercial description	**Synthetic 9000**			**Semi-synthetic 7000**		**Mineral 5000**
S.A.E. norms	**0 W 40**	**5 W 30**	**5 W 40**	**10 W 40**	**15 W 50**	**15 W 40**
Climate	Cold	Cold		Temperate	Hot	Cold
						Temperate
		Temperate		Hot		Hot
Petrol engines (**)	ACEA : A3	ACEA : A5	ACEA : A3	ACEA : A3		ACEA : A2/B2
	API : SJ	API : SL				API : SL/CF
Diesel engines (*)	Prohibited	ACEA : B3	ACEA : 33 ou B4	ACEA : B3		Prohibited
		API : CF				

(*) (*) In winter, on the HDi engine, it is advised to use **5 W 30** or **5 W 40** oil instead of **10 W 40** oil, this to enhance starting from cold.

(**) Oil filter specific to **C1 petrol** with a "U.S." fixing step.

For more information, refer to the lubricants bulletin for the model year in Laser under **PDI/MAINTENANCE**.

NOTE : For **C1 petrol**, use of **TOTAL 15 W 40 ACTIVA 5000** : norm API SL/CF or ACEA A2/B2 is recommended.

WARNING : For vehicles with a maintenance interval of **30 000 km (20 000 miles)**, use exclusively **TOTAL ACTIVA/QUARTZ 7000 or TOTAL ACTIVA/QUARTZ FUTURE 9000** or any other oil with specifications equivalent to these. Failing this, you can follow the maintenance intervals for severe operating conditions.

NOTE : These oils have specifications higher than those defined by norms ACEA A3 or API SJ/SL.

RECOMMENDED LUBRICANTS

GEARBOX OIL

All countries	All Types of gearbox	**ExxonMobil LV 75 W GL.4**

ENGINE COOLANT : PETROL ENGINE

		Packs	Part No
All countries	S-LLC pink fluid	**1** Litre	**9735 Y5**
		5 Litres	**9735 Y6**

WARNING : Never use PSA coolant (G33) on C1 petrol engines.

ENGINE COOLANT : DIESEL ENGINE

		Packs	CITROËN Part No.	
			GLYSANTIN G33	REVKOGEL 2000
All countries	CITROËN fluid Protection : - 35C°	**2** Litres	**9979 70**	**9979 72**
		5 Litres	**9979 71**	**9979 73**
		20 Litres	**9979 76**	**9979 74**
		210 Litres	**9979 77**	**9979 75**

RECOMMENDED LUBRICANTS

BRAKE FLUID
Synthetic brake fluid

		Packs	CITROËN Part No.
All countries	**CITROËN** fluid	**0,5** Litre	**9979 05**
		1 Litre	**9979 06**
		5 Litres	**9979 07**

LIQUIDE LAVE-VITRES

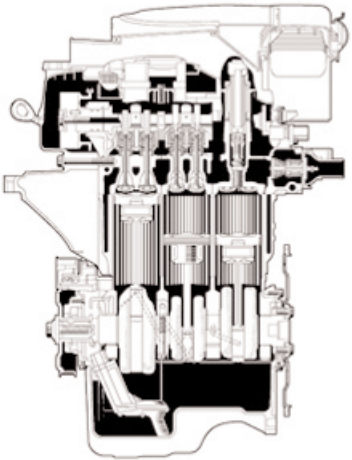
	Packs		CITROËN Part No.		
All countries	Concentrate : **250** ml		**9980 33**	**ZC 9875 953U**	**9980 56**
	Fluid ready-to-use	**1** Litre	**9980 06**	**ZC 9875 784U**	
		5 Litres	**9980 05**	**ZC 9885 077U**	**ZC 9875 279U**

GRAISSAGE
Utilisation générale

		Norms : NLGI
All countries	**TOTAL MULTIS 2**	**2**
	TOTAL PETITES MECANISMES	

ENGINE SPECIFICATIONS		
	Petrol	**Diesel**
	1.0i	**1.4 HDi**
Engine type	**CFA**	**8HT**
Cubic capacity (cc)	998	1398
Bore / Stroke	71/84	73,7/85
Compression ratio	10,5/1	18/1
Power ISO or EEC KW - rpm	50-6000	40-3000
Maximum power DIN (hp-rpm)	68-6000	54-3000
Torque ISO or EEC (m.daN - rpm)	9,3-3600	13-3000

PRESENTATION OF ENGINE 384 F (CFA)



B1B201XD

Engine : CFA

Description.

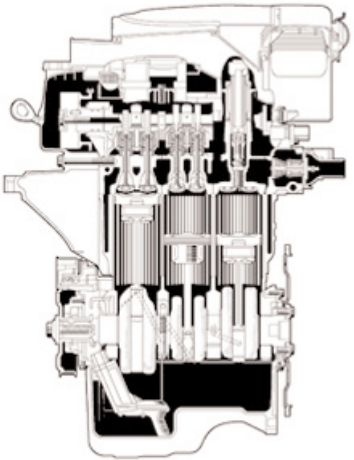
The petrol engine **384F** used on the new vehicle has been developed recently. This is a **1.0** engine with **3 cylinders** in line, with **12 overhead valves**.

This engine is light and compact, giving good fuel economy.

It uses DIS (Direct Ignition System) and VVT-i (Variable Valve Timing-intelligent).

The search for high performance, silence in operation, reduced fuel consumption and low emissions were all decisive in its design

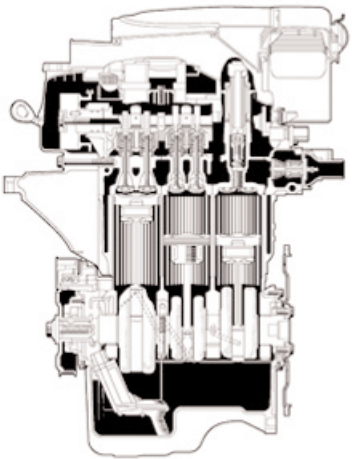
PRESENTATION OF ENGINE 384 F (CFA)



B1B201XD

Engine : CFA	
Number of cylinders and arrangement	: **3 cylinders in line**
Timing	: **12 valves, overhead camshaft driven by chain (with VVT-i)**
Combustion chamber	: **Wedge-shaped**
Manifolds	: **Cross flow**
Fuel delivery system	: **Electronic injection**
Ignition system	: **DIS**
Cylindrical capacity (cc)	: **998**
Bore/Travel (mm)	: **71 x 84**
Compression ratio	: **10.5 : 1**
Maximum power (SAE-NET)	: **50 kW at 6000 rpm**
Maximum torque (SAE-NET)	: **93 Nm at 3600 rpm**

PRESENTATION OF ENGINE 384 F (CFA)

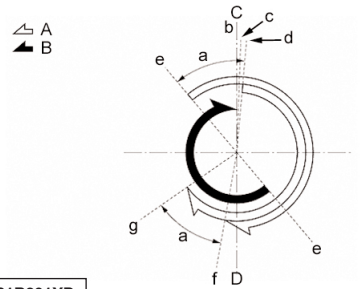


B1B201XD

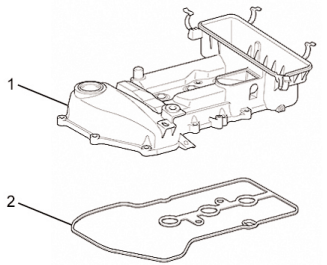
Engine : CFA	
Adjustment of inlet valves (opening)	: **40° after TDC - 5° after TDC**
Adjustment of inlet valves (closing)	: **10° after BDC - 55° after BDC**
Adjustment of exhaust valves (opening)	: **40° before BDC**
Adjustment of exhaust valves (closing)	: **2° after TDC**
Ignition sequence	: **1-2-3**
Fuel	: **Unleaded petrol**
Octane	: **95 or above**
Oil quality	: **API SJ, SL, EC or ILSAC**
Emission standard	: **EURO 4**
Weight, empty in running order kg)	: **75 kg (approx.) (*)**

(*) : weight full of oil and coolant.

PRESENTATION OF ENGINE 384 F (CFA)



B1B201YD



B1B201ZD

Engine : CFA

Valve adjustments.

A : angle of opening of inlet valve.
B : angle of opening of exhaust valve
C : TDC
D : BDC.

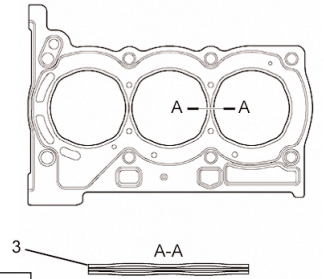
"a" operating range of VVT-i.
"b" 0°
"c" 2°
"d" 5°
"e" 40°
"f" 10°

Engine block

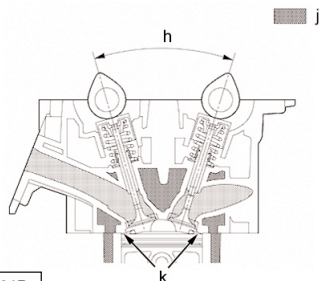
Valve cover

The valve cover (**1**) is made of plastic and incorporates the air filter housing, so reducing weight. The valve cover gasket (**2**) is made of acrylic rubber. This material is known for its resistance to heat as well as for long life.

PRESENTATION OF ENGINE 384 F (CFA)



B1B2020D



B1B2021D

Engine : CFA

Cylinder head gasket

A-A : transversal section.
(3) : shim.

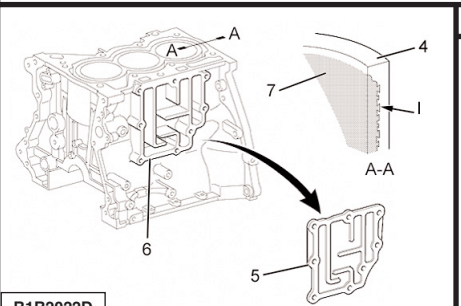
The cylinder head gasket used is in laminated steel.
The gasket surface is coated with **NBR** in order to make the cylinder head more air-tight.

NOTE : NBR (Nitrile Butadiene Rubber) : rubber material known for its resistance to heat, oil and wear.

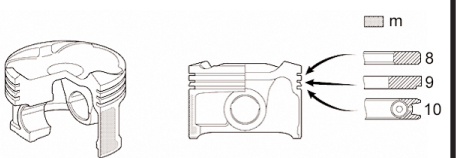
Cylinder head

The sparking plugs are placed at the centre of the combustion chambers so as to make the engine less subject to knock.
The angle formed between the inlet valves and the exhaust valves is more closed. It has been fixed at **33.5° "h"** to permit a cylinder head of a more compact construction.
The combustion chambers are double wedge-shaped **"k"**.
The shape of the inlet ducts has been optimised for improved combustion.
The cylinder head is fixed with extended tension bolts.
The extension of the coolant channels **"j"** into the cylinder head has been optimised for better cooling.

PRESENTATION OF ENGINE 384 F (CFA)



B1B2022D



B1B2023D

Engine : CFA

Engine block

(5) oil separator cover

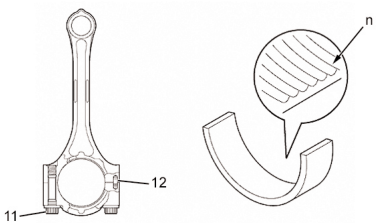
An aluminium engine block **(4)** with a wall thickness of **7 mm** between the cylinder bores produces an engine that is light and compact.
An oil separator **(6)** incorporated in the engine block **(4)**, where the exhaust gases pass, thus separates the engine oil from the gases passing from the combustion chambers to the sump so as to preserve the quality of the engine oil and to reduce oil consumption.
It is not possible to rebore the engine block given the type of channels **(7)**. The channels **(7)** present an exterior **"fin-like"** structure which allows a larger surface of contact with the aluminium block by dint of the numerous irregularities **"I"**. This solution enhances heat dissipation, thus reducing overall temperature and deformation of the bores

Pistons.

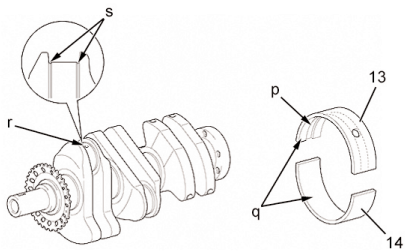
"m" resin coating.
(8) compression ring **N°1**
(9) compression ring **N°2**
(10) scraper ring.

The pistons are in aluminium alloy.
The piston crowns are conical for enhanced combustion.
A new LFA coating (low friction resin and aluminium oxide) is used on the piston skirts.
The low tension piston rings give lower friction and thus reduced fuel consumption

PRESENTATION OF ENGINE 384 F (CFA)



B1B2024D



B1B2025D

Engine : CFA

Con rods and big end bearing shells

(12) gudgeon pin

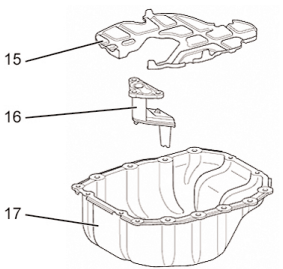
The forged steel con rods have increased rigidity and reduced weight.
The con rod caps are fixed with extended tension screws **(11)**.
The glide surfaces of the big end bearing shells have micro-grooves **"n**" for optimal oil release. This solution results in the engine starting more readily from cold, also reducing vibrations.

Crankshaft and crankshaft bearings

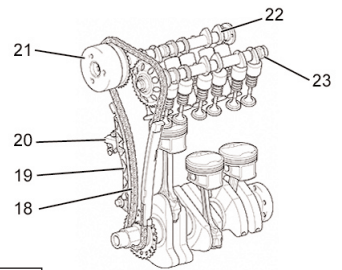
"r" hole for the oil.
(13) upper bearing shells.
(14) lower bearing shells.

The crankshaft possesses **4 journals** and **6 counterweights.**
All the journal contact surfaces are roll-finished **"s"** in order to maintain the appropriate rigidity.
The crankshaft bearing shells are in aluminium alloy.
The surfaces of the crankshaft bearing shells have micro-grooves **"q"** for optimal oil release. This solution results in the engine starting more readily from cold.
The upper bearing shells have an oil groove **"p"** on the inner circumference

PRESENTATION OF ENGINE 384 F (CFA)



B1B2026D



B1B2027D

Engine : CFA

Oil sump

(15) protection plate.
(17) oil sump.

The oil strainer **(16)** is made of plastic to reduce weight.

Valve timing system

General

(18) timing chain.
(19) chain guide.
(20) chain tensioner.
(21) inlet camshaft.
(21) exhaust camshaft.

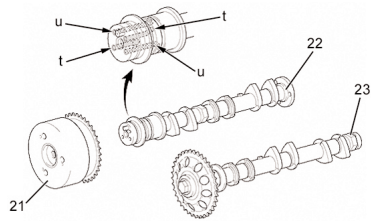
Each cylinder has **2 inlet valves** and **2 exhaust valves**. The performance of the inlet and exhaust circuits is increased by the greater width of the ports.

Opening and closing of the valves is controlled directly by **2 camshafts**.

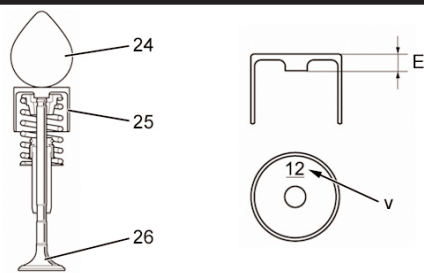
The engine has **12 valves** and **2 overhead camshafts** driven by chain, one for inlet and the other for exhaust.

The **VVT-i** system **(21)** serves to reduce fuel consumption, increase performance and also to reduce pollutant emissions. Fuller information on the control of the **VVT-i** system **(21)** is to be found in the repair manual.

PRESENTATION OF ENGINE 384 F (CFA)



B1B2028D



B1B2029D

Engine : CFA

Camshaft

"t" oil channel (retard).
"u" oil channel (advance).

The end of the inlet camshaft **(22)** is provided with holes for suppling the **VVT-i** system with engine oil under pressure.
The control for the **VVT-i** system **(21)** is fitted on the front end of the inlet camshaft **(22)**, it modifies the adjustment of the inlet valves.

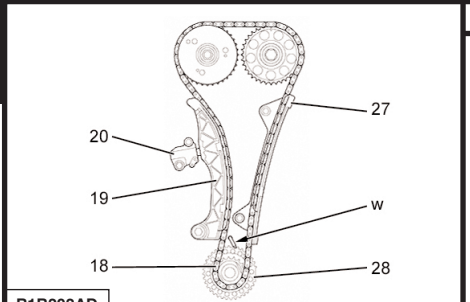
Inlet valves, exhaust valves and cam followers

"v" thickness of cam follower.
"w" reference N°.
(24) camshaft.
The valve stems are of reduced diameter to reduce resistance to the inlet mixture and to the exhaust gases.
The inlet valves **(26)** and the exhaust valves **(26)** use identical springs. These are variable rate springs to make the valves operate correctly.
The cam followers **(25)** are not adjusted using shims, this to reduce weight.

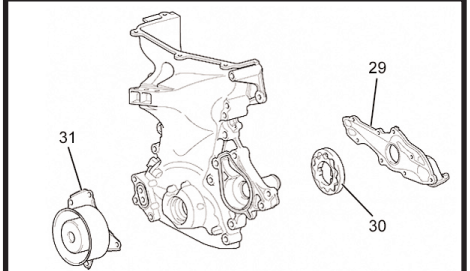
NOTE : Adjustment of valve clearances is done by replacing the existing cam followers with cam followers of the appropriate thickness. Cam followers are available in **29** thicknesses going in intervals of **0.02 mm** from **5.12 mm** to **5.68 mm.**

Fuller information can be found in the repair manual.

PRESENTATION OF ENGINE 384 F (CFA)



B1B202AD



B1B202BD

Engine : CFA

Timing chain and tensioner

(19) chain guide.
(27) chain damper.
(28) timing pinion on crankshaft.

A high-resistance roller chain **(18)** with a pitch of **8 mm** gives reliability and makes the engine more compact.
The chain tensioner **(20)** uses a spring and hydraulic pressure system to retain the correct tension at all times. The chain tensioner **(20)** suppresses the noise generated by the chain.
An oil jet **"x"** lubricates the chain as well as the timing pinion on the crankshaft.

Timing cover

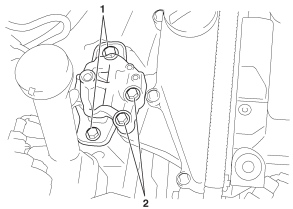
The cover **(29)** of the oil pump **(30)** is incorporated in the timing cover (made of aluminium) on which the water pump **(31)** is mounted.

TIGHTENING TORQUES : ENGINE SUSPENSION

Engine/gearbox suspension

Engine : CFA

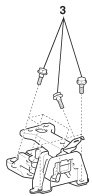
RH engine support

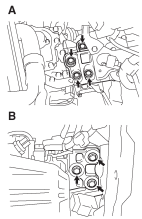


B1B201QD

1	5,2 ± 0,5
2	2,4 ± 0,2

LH engine support





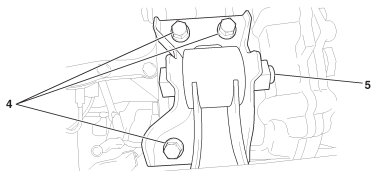
B1B201RD

3	5,2 ± 0,5

A = Screw on box

B = Screw on body

Lower suspension

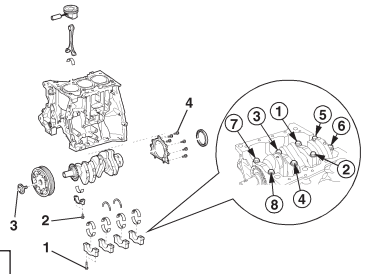


B1B201SD

4	5,2 ± 0,5
5	12 ± 1,2

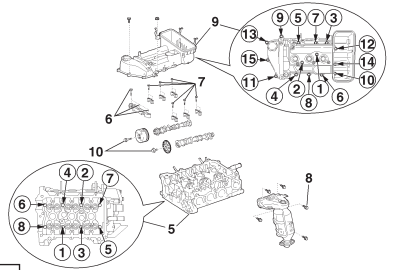
TIGHTENING TORQUES : PETROL ENGINE

Engine : CFA



B1B201DD

	Crankshaft	
1	**Crankshaft bearing cap screws**	**5,9 ± 0,6**
2	**Con rod cap screws** Tightening Angular tightening	 **1,5 ± 0,1** **90° ± 5°**
3	**Crankshaft pulley screw**	**17 ± 1,7**
4	**Seal carrier plate screw**	**1 ± 0,1**

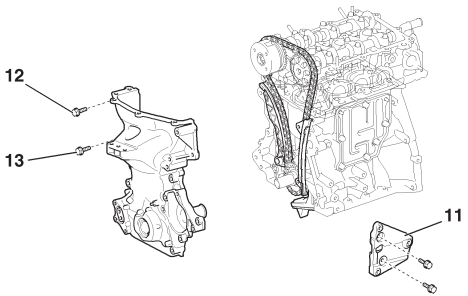


B1B201ED

5	**Cylinder head bolts** Tightening Angular tightening	 **3,2 ± 0,3** **180° ± 5°**
6	**Camshaft bearing cap cover screws *(assembly)***	**1,5 ± 0,1**
7	**Camshaft bearing cap cover screws**	**1,3 ± 0,1**
8	**Exhaust manifold screws**	**2,4 ± 0,2**
9	**Valve cover screws**	**0,8 ± 0,1**
10	**Camshaft pulley screws**	**4,7 ± 0,4**

TIGHTENING TORQUES : PETROL ENGINE

Engine : CFA

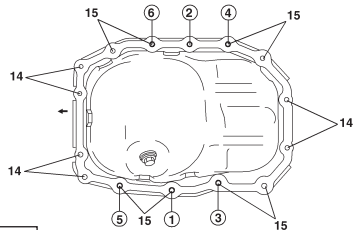


B1B201FD

Crankshaft		
11	**RH engine support** Tightening of screws on block Tightening of screws on body	 **2,4 ± 0,2** **5,2 ± 0,5**
12	**Timing chain cover screw**	**2,4 ± 0,2**
13	**Timing chain cover screw**	**4 ± 0,4**

TIGHTENING TORQUES : PETROL ENGINE

Engine : CFA



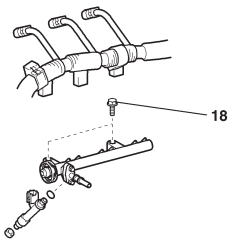
B1B201GD

B1B2015D

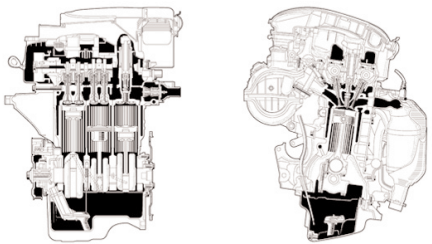
	Lubrication	
	Oil pump	0,9 ± 0,1
14	Sump screws	1 ± 0,1
15	Sump screws	2,4 ± 0,2
	Flywheel /clutch	
16	Flywheel screws	7,8 ± 0,8
17	Clutch plate screws	1,9 ± 0,2

TIGHTENING TORQUES : PETROL ENGINE

Engine : CFA

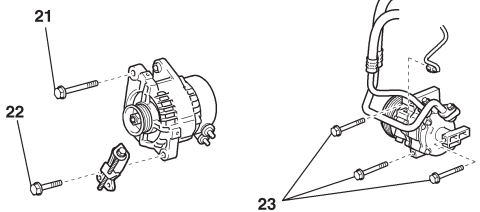


B1B201HD



B1B201XD

	Injection circuit	
18	Injection rail screw on block	2,7 ± 0,3
	Cooling circuit	
19	Coolant pump screws	2,8 ± 0,3
20	Coolant inlet housing screws	0,7 ± 0,1
	Accessories	
21	Alternator screw	4,9 ± 0,5
22	Tensioner screw	3,4 ± 0,4
23	Aircon compressor screw	2,4 ± 0,2



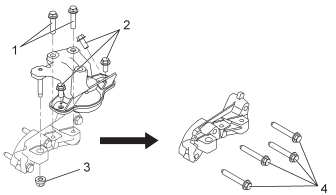
D1A2004D

TIGHTENING TORQUES : ENGINE SUSPENSION

Engine/gearbox assembly suspension

Engine : 8HT

RH engine support



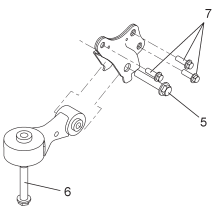
B1B201AD

1	5,2 ± 0,5
2	5,2 ± 0,5
3	5,2 ± 0,5

Lower RH engine support

4	5,7 ± 0,6

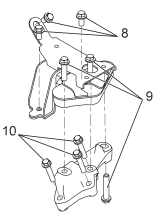
Torque reaction rod



B1B201BD

5	5,2 ± 0,5
6	12 ± 1,2
7	

LH engine support on gearbox



B1B201CD

8	5,2 ± 0,5
9	5,2 ± 0,5
10	5,2 ± 0,5

TIGHTENING TORQUES : DIESEL ENGINE	
Engine	**8HT**
	Crankshaft
Bearing cap fixing screws	
Pre-tightening	**1 ± 0,1**
Slackening	**180° ± 5°**
Tightening	**3 ± 0,3**
Angular tightening	**140° ± 5°**
Con rod screws	
Tightening	**1 ± 0,1**
Angular tightening	**100° ± 5°**
Accessories drive pulley	
Tightening	**3 ± 0,3**
Angular tightening	**180° ± 5°**
	Cylinder block
Oil sump	**1,3 ± 0,1**
Timing belt guide roller	**3,7 ± 0,3**
Timing belt tensioner roller	**2,3 ± 0,2**

TIGHTENING TORQUES : DIESEL ENGINE	
Engine	**8HT**
	Cylinder head
Camshaft bearing cap covers	
Pre-tightening	**0,3 ± 0,1**
Tightening	**1 ± 0,1**
Fixing of camshaft sub-assemblies on cylinder head	
Pre-tightening	**0,3 ± 0,1**
Tightening	**1 ± 0,1**
Exhaust manifold	**3 ±**
Camshaft pulleys	
Pre-tightening	**2 ± 0,2**
Angular tightening	**50° ± 5°**
Cylinder head	
Pre-tightening	**2 ± 0,2**
Tightening	**4 ± 0,4**
Angular tightening	**230° ± 5°**
EGR valve	**1 ± 0,1**
	Flywheel
Flywheel	
Pre-tightening	**1,7 ± 0,2**
Angular tightening	**70° ± 5°**
Clutch mechanism	**2 ± 0,2**

TIGHTENING TORQUES : DIESEL ENGINE

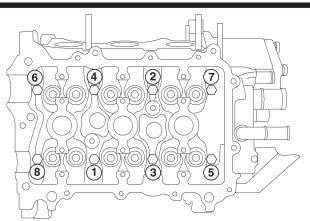
Engine	8HT
	Lubrication circuit
Oil pump assembly	
Pre-tightening	**0,5 ± 0,1**
Tightening	**0,9 ± 0,1**
Oil/coolant heat exchanger	**1 ± 0,1**
Turbocharger lubrication pipe	**3 ± 0,3**
	Diesel injection circuit
Spherical base screw for diesel injection fixing fork	**2,5 ± 0,2**
Fuel high pressure common injection rail on engine block	**2,2 ± 0,2**
Unions on fuel high pressure common injection rail	
Pre-tightening	**1,7 ± 0,1**
Tightening	**2,2 ± 0,2**
Diesel injection pump on support	**2,2 ± 0,2**
Union on diesel injector	
Pre-tightening	**1,7 ± 0,1**
Tightening	**2,2 ± 0,2**
Diesel injection pump pulley	**5 ± 0,5**
Union on diesel high pressure pump	
Pre-tightening	**1,7 ± 0,1**
Tightening	**2,2 ± 0,2**
	Cooling circuit
Coolant pump	
Pre-tightening	**0,3 ± 0,1**
Tightening	**0,9 ± 0,1**
Coolant outlet housing	
Pre-tightening	**0,3 ± 0,1**
Tightening	**0,7 ± 0,1**

TIGHTENING TORQUES : CYLINDER HEAD

Petrol and Diesel engines

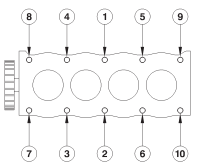
Operation to be performed prior to refitting the cylinder head

Clean the seal faces with the CITROËN-approved product.
Do not use abrasives or cutting tools on the seal faces.
The seal faces must not show any traces of impacts or scratches.
Pass a tap into the threads in the cylinder block that receive the cylinder head bolts.
Brush the threads of the cylinder head bolts.
Coat the threads and under the heads with **MOLYKOTE G.RAPIDE PLUS**.



B1D2028D

Engines	Tightening		Cylinder head bolts (Max. re-usable length i`n mm)
CFA	Tightening Angular tightening	**3,2 ± 0,3** **180° ± 5°**	**123,5**



B1D2019D

8HT	Pre-tightening Tightening Angular tightening	**2 ± 0,2** **4 ± 0,4** **230° ± 5°**	**149**

BELT TENSION/SEEM UNITS CORRESPONDENCE TABLE

4099-T (C.TRONIC.105) ← **Tools** → **4122-T** (C.TRONIC.105.5)

TYPE DE COURROIES / 1 daN = 1 Kg daN	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	daN 1 daN = 1 Kg / TYPE DE COURROIES
S	18	28	36	44	51	58	64	70	76	82	88	94	100	106	112						
	18	28	36	44	51	58	64	70	76	82	88	94	100	106	112						
P E5	18	23	27	31	34	37	40	43	46	49	52	54	56	58	60	62	64	66	68		
P E6	25	32	39	45	50	54	58	62	66	70	74	78	81	84	86	88	89	90	91		
	32	41	48	55	62	69	76	83	90	96	102	108	114	120	126	132	138	144	150		
P E6 10	27	36	43	49	55	61	66	71	76	80	84										
	32	41	49	57	63	69	75	81	87	93	99										
P E6 11	26	35	42	48	53	58	63	68	73	78	82										
	30	40	47	54	61	68	75	81	87	93	99										
P E7 13	45	55	65	74	83	89	95	101	107	113	119										
	36	49	52	64	73	80	86	92	98	104	110										
T E7 10	28	34	39	44	48	52	56	60	64	68	71										
	34	41	48	55	62	69	76	83	89	96	102										
T E8 11	32	39	45	51	56	61	66	71	76	79	81										
	37	43	51	59	66	73	80	86	92	98	104										
T E9 13	52	60	67	74	81	88	94	100	106	110	114										
	49	57	63	69	75	81	87	93	99	105	111										

AUXILIARY EQUIPMENT DRIVE BELT		
	Petrol	Diesel
	1.0i	1.4 HDi
Engine plate	CFA	8HT
C1	X	X
See pages :	46 to 47	48 to 49

AUXILIARY EQUIPMENT DRIVE BELT

Engines : Petrol and Diesel

TOOLS

Belt tension measuring instrument : **4122 - T** *(C.TRONIC 105.5)*

WARNING : If using tool 4099-T *(C.TRONIC 105)*

ESSENTIAL.

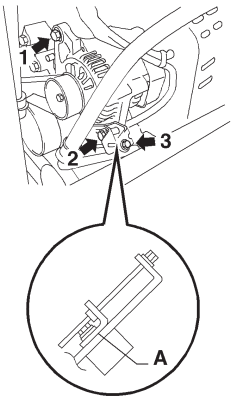
Before refitting the auxiliary equipment drive belt, check that:

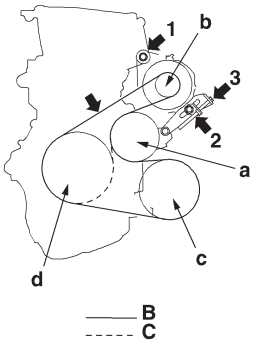
1) The roller(s) rotate freely (no play or stiffness)

2) The belt is correctly engaged in the grooves of the various pulleys.

AUXILIARY EQUIPMENT DRIVE BELT

Engine : CFA





B1B2000D

Removing

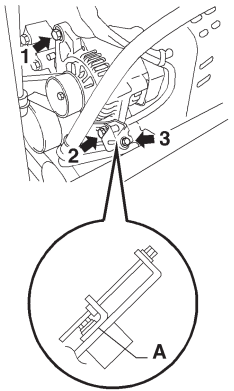
"a" Tension pulley
"b" Alternator pulley
"c" Compressor pulley.
"d" Crankshaft pulley.

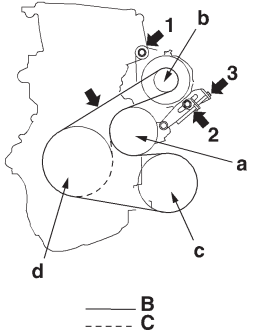
B : With aircon
C : Without aircon.

Slacken the screw **(1)**.
Slacken the screw **(2)**.
Do up the screw **(2)** without tightening it, until there is no more play **A**.
Slacken the screw **(3)**.
Remove the trapezoidal belt from the ventilator and from the alternator.

AUXILIARY EQUIPMENT DRIVE BELT

Engine : CFA





B1B2000D

Refitting

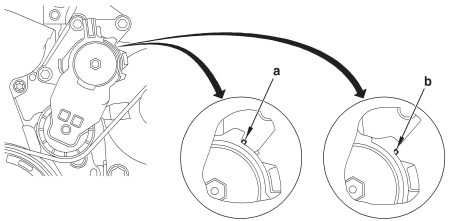
Refit the trapezoidal belt on the ventilator and on the alternator.
"a" Tension pulley
"b" Alternator pulley.
"c" Compressor pulley
"d" Crankshaft pulley.

B : With aircon
C : Without aircon.

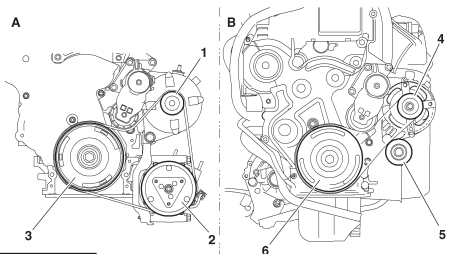
Do up the screw **(2)** without tightening it, until there is no more play **A**. Tighten the screw **(3)** to tension the trapezoidal belt on the ventilator and on the alternator.
Check the trapezoidal belt on the ventilator and on the alternator.
Tighten the screw **(2)**.
Tightening torque **: 3,4 ± 0,3 m.daN.**
Tighten the screw **(1)**.
Tightening torque between **: 4,3 and 5,5 m.daN.**
Visually check the cabling of the alternator and listen for any abnormal noise.
Check the circuit of the discharge alert warning lamp

AUXILIARY EQUIPMENT DRIVE BELT

Engine : 8HT



B1E200AD



B1B2010D

Tools.

[1] Compression lever for dynamic tensioner **: (-).0194.E3**
[2] Peg for dynamic tensioner roller **: (-).0194.F**

References on the dynamic tensioner roller
"b" Nominal position.
"a" Position for "**maximum wear**" of the auxiliary drive belt.

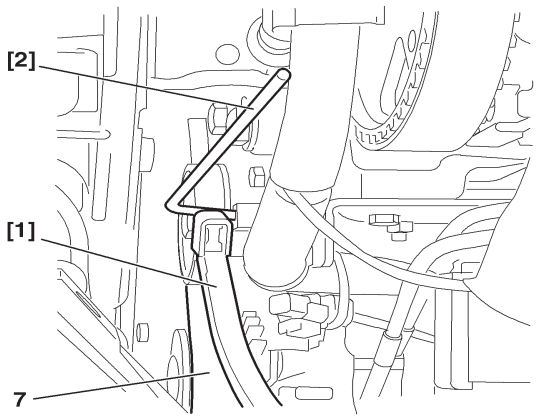
Removing.
Disconnect the battery negative cable.
Raise and support the vehicle, wheels hanging.
Lock the front wheels on full RH lock.
Move aside the splash-shield.

IMPERATIVE : In the case of belt re-use, mark the direction of rotation of the belt. If the index on the tensioner roller is outside the marks, change the auxiliary equipment drive belt.

A : Vehicle with air conditioning
B : Vehicle without air conditioning
1 and **4** Alternator pulley.
3 and **6** Auxiliary drive belt pulley.
5 Guide roller.
2 Aircon compresseur pulley

AUXILIARY EQUIPMENT DRIVE BELT

Engine : 8HT



B1B2011D

Compress the dynamic tensioner roller, using tool **[1]**.
Position the peg **[2]**.
Remove the auxiliary drive belt **(7)**.

Refitting

NOTE : Check that the tensioner roller moves freely (no tight spot). If this is not the case, replace the tensioner roller.

Respect the direction of fitting of the drive belt.
Position the auxiliary drive belt.
Move the tool **[2]** on the tensioner roller to remove the peg **[3].**
Make sure that the drive belt is correctly positioned in the **«V»** grooves of the various pulleys.
Refit the splash-shield.
Reconnect the battery negative cable.

IMPERATIVE : Carry out the operations that are necessary following a reconnection of the battery *(see corresponding operation).*

BELT TENSION/SEEM UNITS CORRESPONDENCE TABLE

4099-T (C.TRONIC.105) ← **Tools** → **4122-T** (C.TRONIC.105.5)

TYPE DE COURROIES \ 1 daN = 1 Kg daN	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	daN 1 daN = 1 Kg TYPE DE COURROIES
S	18	28	36	44	51	58	64	70	76	82	88	94	100	106	112						
	18	28	36	44	51	58	64	70	76	82	88	94	100	106	112						
P E	E5	18	23	27	31	34	37	40	43	46	49	52	54	56	58	60	62	64	66	68	
	E6	25	32	39	45	50	54	58	62	66	70	74	78	81	84	86	88	89	90	91	
		32	41	48	55	62	69	76	83	90	96	102	108	114	120	126	132	138	144	150	
P E 10	E6	27	36	43	49	55	61	66	71	76	80	84									
		32	41	49	57	63	69	75	81	87	93	99									
P E 11	E6	26	35	42	48	53	58	63	68	73	78	82									
		30	40	47	54	61	68	75	81	87	93	99									
P E 13	E7	45	55	65	74	83	89	95	101	107	113	119									
		36	49	52	64	73	80	86	92	98	104	110									
T E 10	E7	28	34	39	44	48	52	56	60	64	68	71									
		34	41	48	55	62	69	76	83	89	96	102									
T E 11	E8	32	39	45	51	56	61	66	71	76	79	81									
		37	43	51	59	66	73	80	86	92	98	104									
T E 13	E9	52	60	67	74	81	88	94	100	106	110	114									
		49	57	63	69	75	81	87	93	99	105	111									

CHECKING AND SETTING THE VALVE TIMING		
	Petrol	Diesel
	1.0i	1.4 HDi
Engine plate	CFA	8HT
C1	X	X
See pages :	53 to 69	70 to 77

RECOMMENDATIONS : TIMING BELT

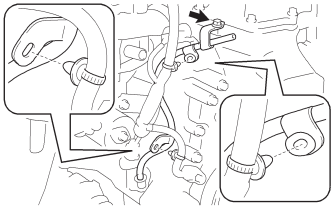
Engines : All Types

Recommendations

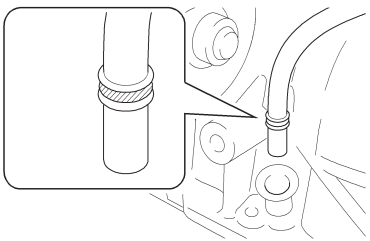
IMPERATIVE : After any repair involving removal of the timing belt, systematically replace :

The timing belt,
The tensioner roller fixing nut.

CHECKING AND SETTING THE VALVE TIMING



B1D201MD



B1D201ND

Engine : CFA

MPERATIVE : Respect the safety and cleanliness requirements.

Removing.

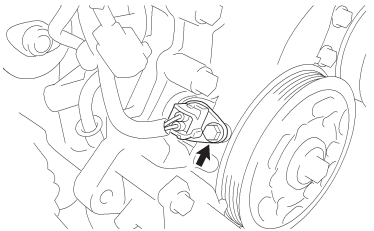
Raise and support the vehicle, wheels hanging.
Disconnect the battery negative cable (see corresponding operation).
Drain the engine oil (see corresponding operation).
Drain the gearbox oil (see corresponding operation).
Drain the cooling circuit (see corresponding operation).
Remove the auxiliary drive belt (see corresponding operation).
Remove the sump.
Remove the driveshafts (see corresponding operation).
Remove the engine-gearbox assembly (see corresponding operation).
Move aside the elastic clip on the coolant pump.
Remove the alternator (see corresponding operation).

Remove the screw and the guide-tube of the oil gauge.

Remove the O-ring seal on the guide-tube of the oil gauge.

CHECKING AND SETTING THE VALVE TIMING

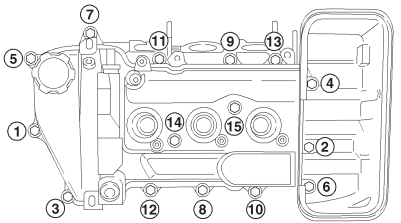
Engine : CFA



B1D201QD

Disconnect the camshaft position sensor.

Remove the screw and the crankshaft position sensor



B1D201RD

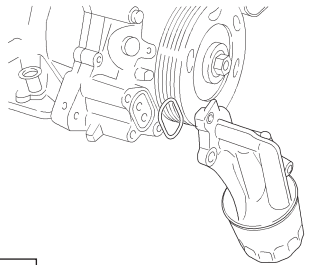
Remove the **13 screws** and the **2 nuts** in the sequence indicated.

Remove the valve cover with its gasket.

Remove the valve cover gasket

CHECKING AND SETTING THE VALVE TIMING

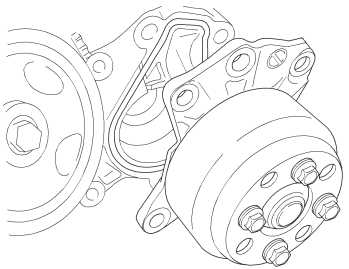
Engine : CFA



B1D201SD

Remove the **3 screws**, the support for the oil filter and its seal

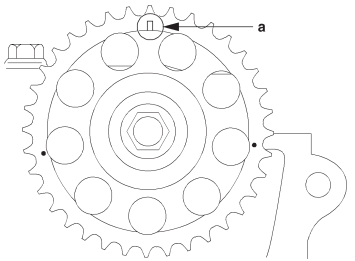
Remove the **5 screws**, the coolant pump and its seal.



B1D201TD

CHECKING AND SETTING THE VALVE TIMING

Engine : CFA



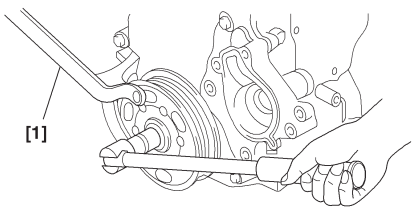
B1D201UD

Turn the crankshaft pulley clockwise in order to align the setting mark **"a"** on the toothed wheel **(0 degrees)** with those on the timing cover.
Make sure that the setting mark **"a"** on the camshaft pulley is on top as indicated.

NOTE : Failing this, turn the crankshaft pulley by one full turn **(360 degrees)** to bring the setting mark to the top.

Lock the crankshaft pulley, using tool **[1]** and remove it.

[1] **: C.0132.AA**

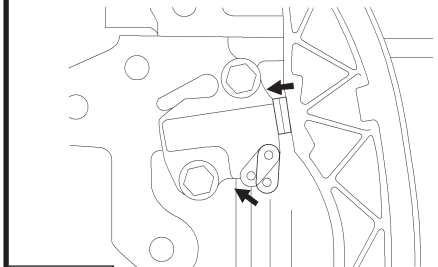


B1D201VD

Remove the timing cover.

CHECKING AND SETTING THE VALVE TIMING

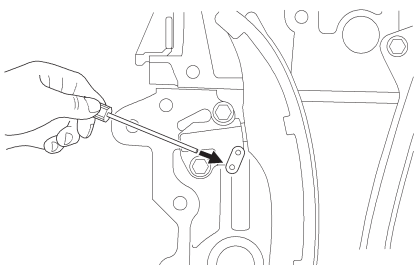
Engine : CFA



B1D201WD

Turn the chain tensioner stop plate clockwise and compress the piston.

Insert peg into the hole in the stop plate so as to lock the tensioner with the thrust piston in the compressed position.



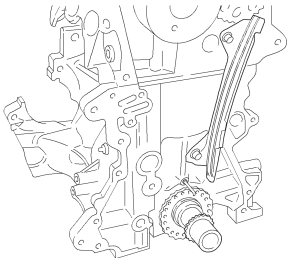
B1D201XD

Remove the **2 screws** and the chain tensioner.

Remove the screw, the chain tensioner guide and the timing chain.

CHECKING AND SETTING THE VALVE TIMING

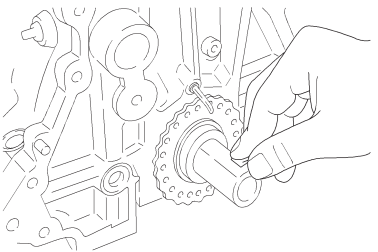
Engine : CFA



B1D201YD

Remove the **2 screws**, the chain guide and the crankshaft toothed wheel.

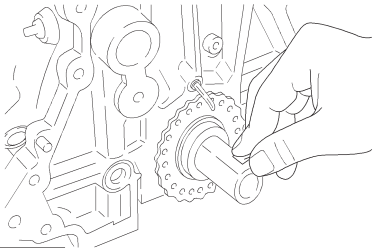
Remove the keyway.



B1D201ZD

CHECKING AND SETTING THE VALVE TIMING

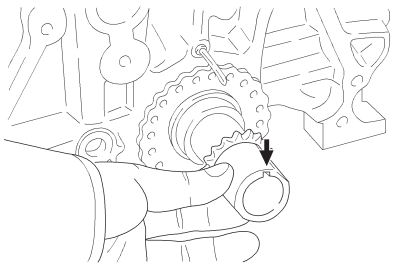
Engine : CFA



B1D201ZD

Refit the keyway in the groove of the crankshaft.

Align the groove of the crankshaft pinion with the keyway of the crankshaft and refit the crankshaft pinion.

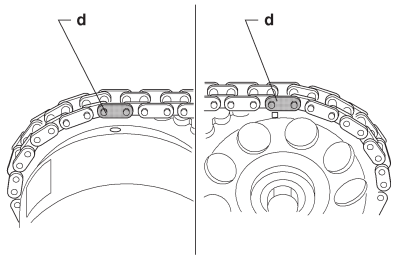


B1D202HD

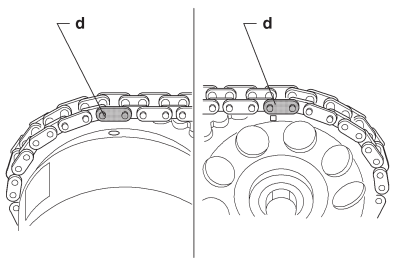
Refit the chain guide with the **2 screws**.

Tightening torque **: 0,9 ± 0,1 m.daN.**

CHECKING AND SETTING THE VALVE TIMING



B1D202JD



B1D202KD

Engine : CFA

To refit the timing chain, align the link **"c"** (yellow in colour) with the setting mark **"b**" on the crankshaft pinion as indicated.

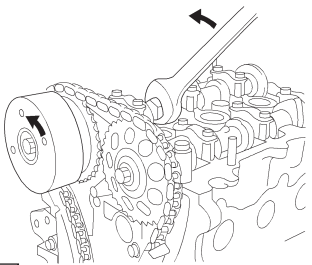
To complete the refitting of the timing chain, align the **2 links "d**" (orange in colour) with the setting marks **"a"** on the camshaft pulleys as indicated.

Refit the chain tensioner guide with the screw.

Tightening torque **: 1,9 ± 0,2 m.daN.**

CHECKING AND SETTING THE VALVE TIMING

Engine : CFA

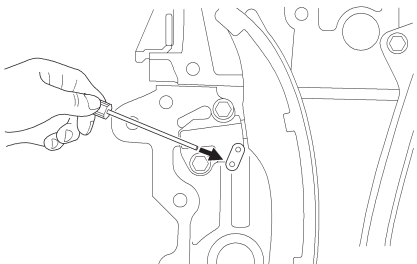


B1D202LD

Turn the hexagonal part of the inlet camshaft anti-clockwise in order to detension the timing towards the tensioner.

Refit the tensioner with the **2 screws**.

Tightening torque between **: 0,8 and 1,3 m.daN.**

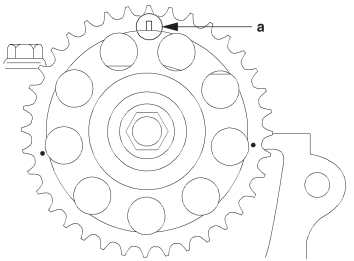


B1D202MD

Remove the peg, rotate the crankshaft by **2 full turns** and unlock the chain tensioner..

CHECKING AND SETTING THE VALVE TIMING

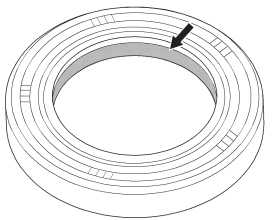
Engine : CFA



B1D202ND

Check that the setting mark **"a"** on the camshaft pulley is on top with the chain in tension.

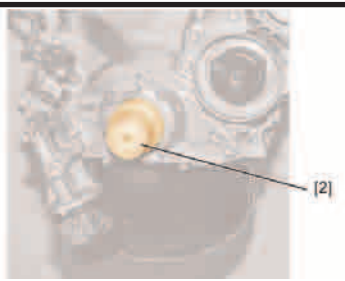
Refit the timing cover.



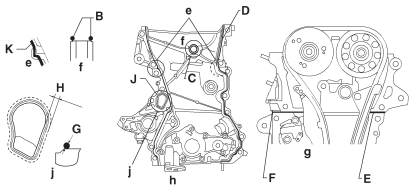
B1D202PD

Coat the lip of a new lip seal with engine oil.

CHECKING AND SETTING THE VALVE TIMING



B1E200HD



B1D202RD

Engine : CFA

Fit the new crankshaft seal using tool **[2]**.

[2] **: 0196.B**

Degrease the sealing faces of the cylinder block and of the timing cover.

References	Dimensions (mm)	References	Dimensions (mm)
B	3	G	3 to 3,5
C	3	H	3,5
D	3,5 to 4,5	I	3 to 3,5
E	4,5 to 5,5	J	3,5 to 4,5
F	4,5 to 5,5		

Apply a strip of seal paste on the cylinder block at «**g**» and on the timing cover at «**h**» as indicated, and refit the timing cover «**h**».

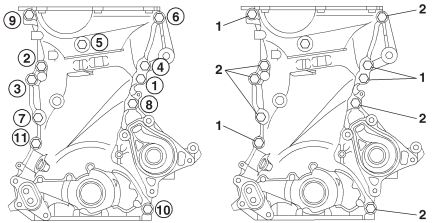
Seal paste : **AUTOJOINT OR.**

WARNING : Refit the timing cover within **3** minutes following the application of the strips of seal paste.

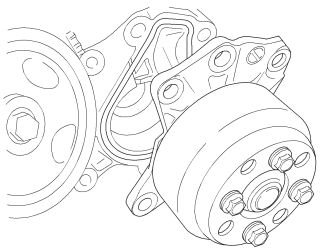
.

CHECKING AND SETTING THE VALVE TIMING

Engine : CFA



B1D202SD



B1D201TD

Tighten the **11 screws** in the sequence indicated.

Tightening torque for screws **(1)** **: 2,4 ± 0,2m.daN.**

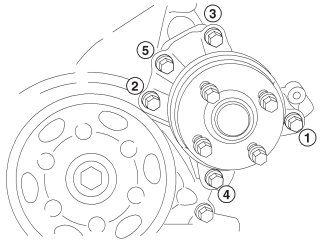
Tightening torque for screws **(2)** **: 4 ± 0,4 m.daN.**

Remove the excess seal paste.

Fit a new coolant pump seal on the timing cover and refit the coolant pump.

CHECKING AND SETTING THE VALVE TIMING

Engine : CFA



B1D202TD

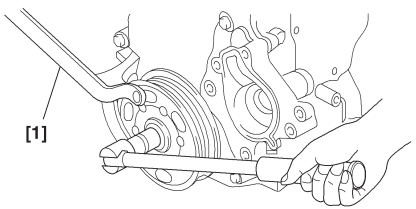
Tighten the **5 screws** in the sequence indicated.

Tightening torque **: 2,8 ± 0,3 m.daN.**

Lock the crankshaft pulley using tool **[1]** and tighten the screw.

[1] **: C.0132.AA**

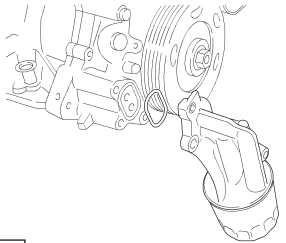
Tightening torque **: 17 ± 1,7 m.daN.**



B1D202UD

CHECKING AND SETTING THE VALVE TIMING

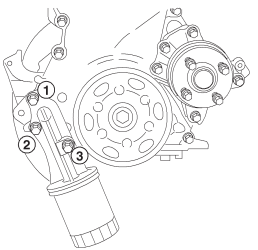
Engine : CFA



B1D201SD

Refit the oil filter seal on the timing cover and refit the oil filter support.

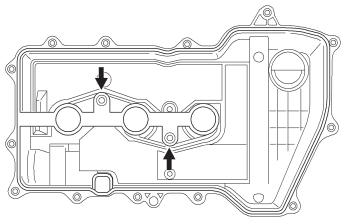
Tighten the **3 screws** in the sequence indicated.



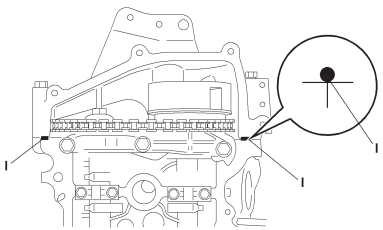
B1D202VD

Tightening torque : between **1,9 and 2,9 m.daN.**

CHECKING AND SETTING THE VALVE TIMING



B1D202WD



B1D200VD

Engine : CFA

Refit the valve cover gasket in the groove of the valve cover and on the centring bosses indicated by the arrows.

WARNING: Check the positioning of the gasket, which must be well seated around the bases of the bosses.

.

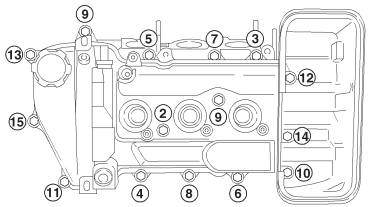
"k" : 3 to 4 mm.

Apply a strip of seal paste **"j"** on the sealing faces of the cylinder head and of the timing cover.

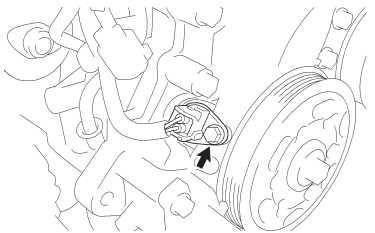
Seal paste : **AUTOJOINT OR.**

WARNING: Refit the valve cover within **3 minutes** and tighten the screws and nuts within **15 minutes** following application of the strip of seal paste **"j"**.

CHECKING AND SETTING THE VALVE TIMING



B1D202XD



B1D201QD

Engine : CFA

Tighten the **13 bolts** and **2 nuts** to the correct torque in the sequence indicated.

Tightening torque **: 0,8 m.daN.**

After tightening all the screws and nuts, check that **"1"** and **"2"** are tightened to the correct torque.

Refit the crankshaft position sensor.

WARNING: Do not use any component that has been dropped or knocked.

WARNING: Check the condition of the O-ring seal before refitting it.

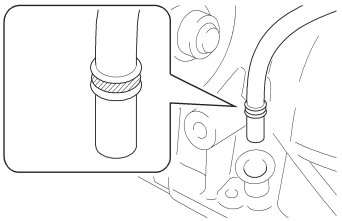
Coat the O-ring seal with a thin layer of engine oil.

Refit the crankshaft position sensor with the screw.

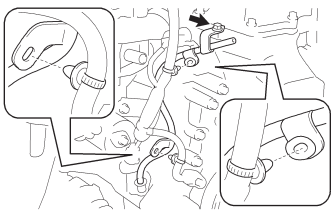
Tightening torque **: 0,8 m.daN.**

Connect the connector of the crankshaft position sensor.

CHECKING AND SETTING THE VALVE TIMING



B1D201ND



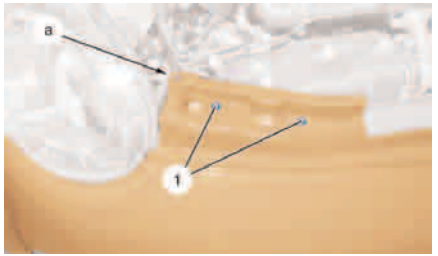
B1D201MD

Engine : CFA

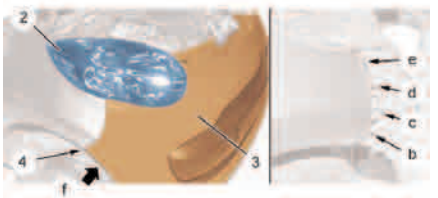
Fit a new O-ring seal on the guide-tube of the oil level gauge.
Coat the O-ring seal with a thin layer of engine oil.
Refit the guide-tube of the oil level gauge with the screw.
Tightening torque **: 1 ± 0,1 m.daN.**
Refit the alternator *(see corresponding operation)*.
Position the elastic clip for the coolant pump.
Apply seal paste *(AUTOJOINT OR)* on the surround of the sump.
Refit the engine-gearbox assembly *(see corresponding operation)*.
Refit the driveshafts *(see corresponding operation)*.
Refit the sump.
Refit the auxiliary drive belt *(see corresponding operation)*.
Fill and top up the engine and the gearbox *(see corresponding operation)*.
Fill and bleed the engine cooling circuit *(see corresponding operation)*.
Check all the levels.
Reconnect the battery negative terminal.

IMPERATIVE : Perform the operations that are required following a battery reconnection *(see corresponding operation).*

CHECKING AND SETTING THE VALVE TIMING



C4A2003D



C4A2004D

Engine : 8HT

Tools.

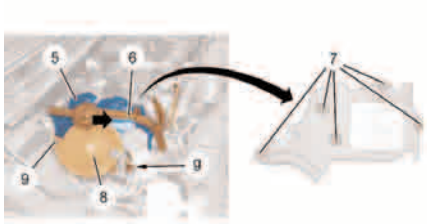
[1] Engine flywheel setting peg	**: (-).0194.C**
[2] Camshaft setting peg	**: (-).0194.B**
[3] Crankshaft setting peg	**: (-).0194.A**
[4] Movable mirror	
[5] Tool for removing exhaust clips	**: C.193.A**
[6] Hose clamp	**: (-).0188.AD**

Removing.

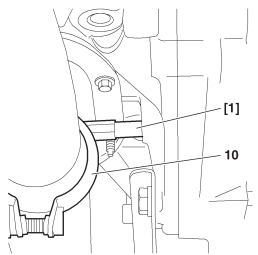
Preliminary operations

Disconnect the battery negative terminal.
Place the vehicle on a **2**-column lift.
Remove the screws **(1).**
Move aside the bumper at **"a".**
Remove the plastic rivet **(4).**
Apply a force upwards at **"f".**
Detach in the sequence **"b", "c", "d", "e".**
Move aside the bumper **(3).**
Remove the headlamp **(2).**

CHECKING AND SETTING THE VALVE TIMING



B1B2009D



B1J2002D

Engine : 8HT

In the engine compartment

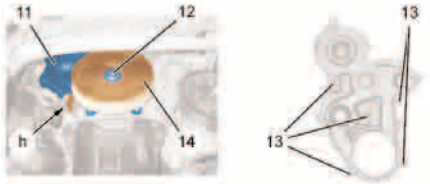
Remove the screw **(9)**.
Disconnect the connector at "**g**".
Move aside the header tank **(8)**.
Detach the harness **(6)** on the timing cover **(5)**.
Refit :
- the screws **(7)**
- the upper timing cover **(5)**

Put the header tank **(8)** back in its initial position.
Remove the accessories drive belt *(see corresponding operation)*.

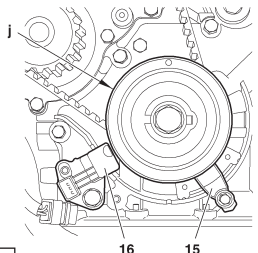
Under the vehicle

Remove the exhaust clip **(10)** using tool **[5]**.
Uncouple the exhaust line.
NOTE : Removing the exhaust clip prevents the front flexible pipe from being damaged. Twisting, pulling and bending reduces the life of the front flexible exhaust pipe.
Rotae the engine by means of the crankshaft pulley screw to bring it to the flywheel locking position, using tool **[1]**.
NOTE : The locking hole is under the engine

CHECKING AND SETTING THE VALVE TIMING



B1E2000D



B1E2004D

Engine : 8HT

Remove :

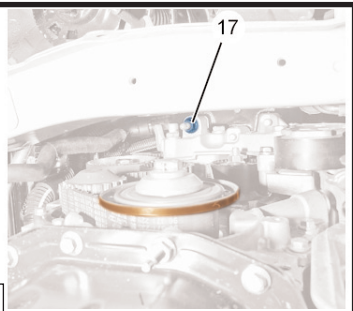
- the screw **(12)**
- the accessories drive pulley **(14)**

Refit the screw **(12)**.
Remove the peg **[1]**.
Disconnect the connector at **"h"**.
Slacken the screws **(13)**.
Remove the lower timing cover **(11)**.

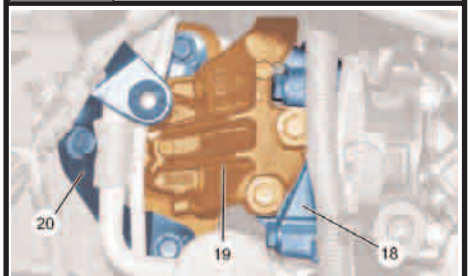
IMPERATIVE : The magnetic track "j" of the crankshaft pinion should show no signs of damage and should not be approached by any other source of magnetism.

Remove :
- the engine speed sensor **(16)**
- the belt retaining stop **(15)**

CHECKING AND SETTING THE VALVE TIMING



B1E2005D



B1B200GD

Engine : 8HT

Remove the nut **(17)**.

In the engine compartment

Move aside the header tank.
Support the engine with a roller jack equipped with a block.

Remove :

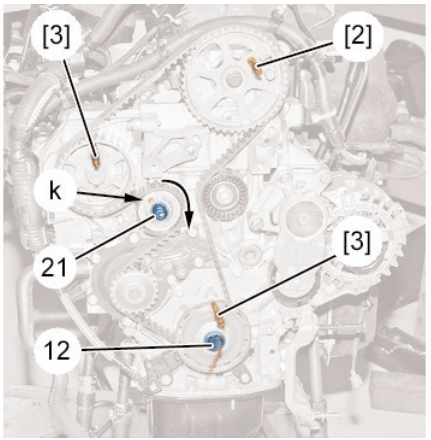
- the bottom support of the expansion chamber **(20)**
- the engine support **(19)**
- the intermediate engine support **(18)**

Lower the engine by **3 cm**.

WARNING : Operate the jack with care. Do not leave the engine without support. Take care with the routing of the header tank hose. Check for any interference between the lower crossmember and the heat shield of the catalytic converter.

CHECKING AND SETTING THE VALVE TIMING

Engine : 8HT



B1E2006D

NOTE : The engine has to be lowered by **3 cm** so that you can position the crankshaft by means of the peg.

Rotate the engine by means of the crankshaft pinion screw **(12)** clockwise, to bring it to the pegging position.

Position :

- the camshaft pinion, using the peg **[2]**

- the fuel high pressure pump, using the peg **[3]**

- the crankshaft pinion, using the peg **[3]**

Hold the tensioner roller in place, by means of a hexagonal spanner at "**k**".

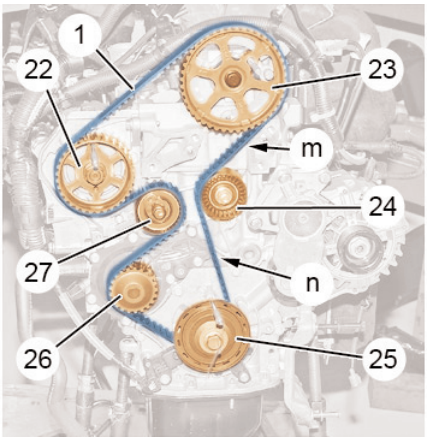
Slacken the screw **(21)**.

Detension the timing belt by pivoting the tensioner roller clockwise at "**k**".

Remove the timing belt.

CHECKING AND SETTING THE VALVE TIMING

Engine : 8HT



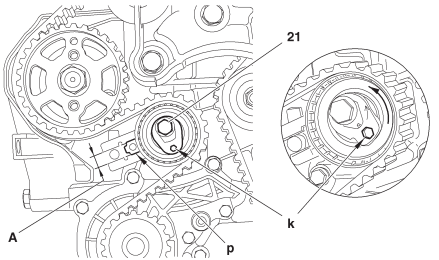
B1E2007D

Refitting

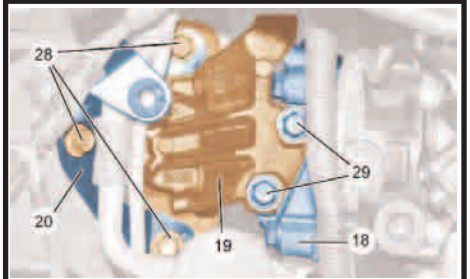
Preliminary operations
IMPERATIVE :
Check the condition of the seals for the camshaft and the crankshaft pinion. If in doubt don't hesitate to change the seals.
Check that there are no leaks at the coolant pump. If in doubt don't hesitate to change it.
Check that both the tensioner roller and the guide roller can turn freely (no tight spots). If this is not the case, replace the rollers.

Refitting the belt
IMPERATIVE : Replace the belt as well as the crankshaft pinion screw (12) with new at each removal. Do not twist or bend the belt.
NOTE : Pegging the high pressure pump serves to increase the life of the timing belt.
NOTE : Use of the tool **[6]** on the camshaft pinion **(23)** makes the operation to fit the timing belt easier**.**
WARNING : The setting pegs have to be in place on the engine**.**
NOTE : If the belt sections **"l", "m"** and **"n"** are not kept taut during the tensioning of the belt, the timing becomes offset. The engine suffers damage.
Reposition the timing belt, sections **"l", "m"** and **"n"** kept taut, on the following components :
- Crankshaft pinion **(25)**, guide roller **(24)**, camshaft pinion **(23)**, fuel high pressure pump pulley **(22)**, coolant pump pinion **(26)**, tensioner roller **(27).**

CHECKING AND SETTING THE VALVE TIMING



B1E2008D



B1B200HD

Engine : 8HT

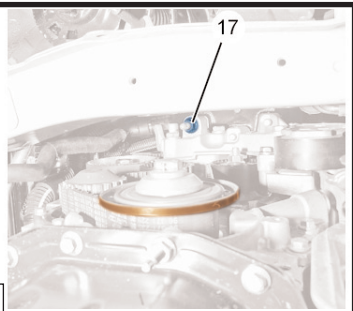
NOTE : The tensioning operation is made easier by use of a mirror.
Move the tensioner roller at **"k"** anti-clockwise by means of a hexagonal spanner.
Rotate the tensioner roller to bring the index **"p"** to position **"q".**
-Tighten the screw **(21)** of the tensioner roller to **: 3 ± 0,3 m.daN.**
Remove the pegs **[2]** and **[3]**.

IMPERATIVE : Check that the crankshaft pinion is firmly on the crankshaft.

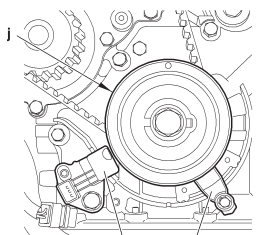
Rotate the engine **10 turns**.
Check the pegging of the camshaft, the pegging of the crankshaft pinion, the pegging of the fuel high pressure pump and the correct positioning of the index on the dynamic tensioner (see diagram) ; use a mirror.
If these are not correct, restart the operation to position the timing belt.

In the engine compartment
Raise the engine back to its initial position.
Refit :
the intermediate engine support **(18)**
- tighten the screws to **: 5,7 ± 0,5 m.daN.**
the RH engine support **(19)**, the bottom support of the expansion chamber **(20)** and the screws **(29)** and **(28)** without tightening them
Remove the jack.
Tighten :
-the screws **(29)** to **: 6 ± 0,6 m.daN.**
-the screws **(30)** to **: 5,2 ± 0,5 m.daN.**

CHECKING AND SETTING THE VALVE TIMING



B1E2005D



B1E2004D

Engine : 8HT

Under the vehicle.

Refit the nut **(17)**, tighten to **: 6 ± 0,6 m.daN.**

Refit :

- the engine speed sensor **(16)**
- the belt retaining stop **(15)**, tighten to **: 0,7 ± 0,1 m.daN.**
- the lower timing cover **(11)**

Lock the engine flywheel, using tool **[1]**.

Remove the screw **(12)**.

Refit : the accessories drive pulley **(14)**, the screw **(12)** (new).

Tighten the screw of the accessories drive pulley **(12)** :

- Pre-tightening **: 3 ± 0,3 m.daN.**
- Angular tightening **: 180° ± 5°.**

Remove tool **[1]**.

Refit the exhaust clip, using tool **[5]**.

In the engine compartment

Refit :

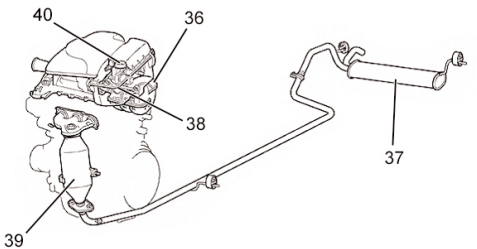
- the upper timing cover **(5)**
- the expansion chamber **(8)**
- the accessories drive belt (see corresponding operation)

Proceed in the reverse order to the removal operations.

Reconnect the battery negative terminal.

IMPERATIVE : Perform the operations that are required following a battery reconnection (see corresponding operation).

EXHAUST LINE SPECIFICATIONS



B1B202FD

Engine : CFA

Inlet and exhaust system

General

(37) Silencer.

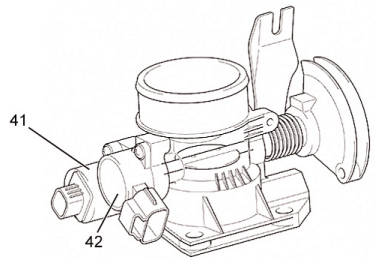
An inlet manifold **(36)** made of plastic to reduce weight.

The butterfly body **(40)** is of plastic.

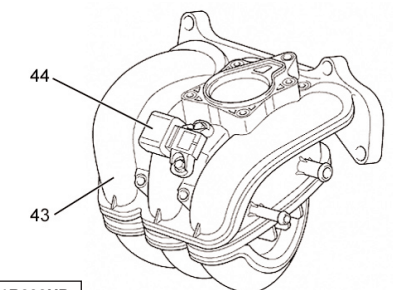
The valve cover **(1)** is of plastic. It incorporates the air filter housing **(38)**.

The exhaust manifold **(39)** and piping are of stainless steel. These reduce weight and have better resistance to corrosion.

EXHAUST LINE SPECIFICATIONS



B1B202GD



B1B202HD

Engine : CFA

Butterfly body (manual gearbox)

(42) : butterfly position sensor.

The butterfly body **(40)** is of plastic to reduce weight.

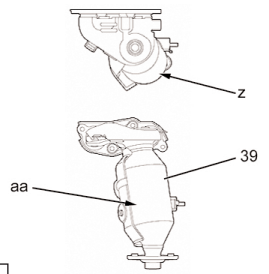
An idle control valve **(41)** of the stepper motor type is fitted inside the butterfly body **(40)**.

Inlet manifold

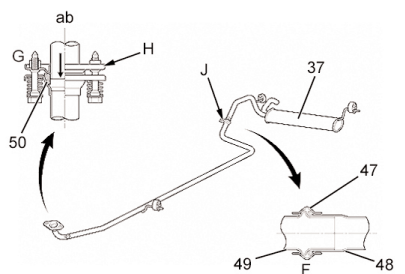
The inlet manifold **(43)** is of plastic to reduce weight and the quantity of the heat transmitted by the cylinder head. This solution reduces the temperature of the inlet air and increases the inlet performance by volume.

The inlet manifold comprises a depressiometer **(44)** for measurement of inlet vacuum and a sensor for measurement of inlet air temperature.

EXHAUST LINE SPECIFICATIONS



B1B202KD



B1B202LD

Engine : CFA

Exhaust manifold

"aa" view from above.
"ab" front view.

The exhaust manifold **(39)** made of stainless steel is designed both to enhance the rise in temperature of the 3-way catalytic converter and to reduce weight.

The catalytic converter uses ceramics with ultra-thin walls with high cell density. The optimisation of cell density of the catalytic converter serves to reduce pollutant emissions .

Exhaust pipe

"ac" from the exhaust manifold.
(47) tightening clip
(48) front pipe.
(49) rear pipe
(50) gasket.

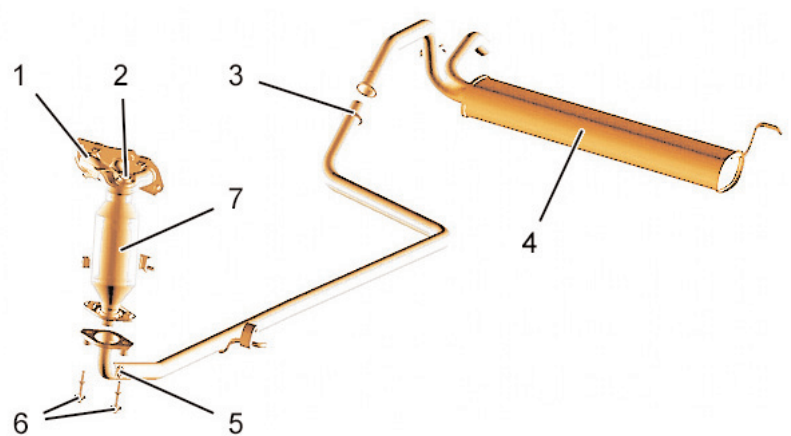
The silencer **(37)** has been optimised with the aim of making it both compact and light.

The junction between the front and rear parts **H** of the exhaust pipe is by means of the insertion **E**, making a gasket no longer necessary.

The junction of the exhaust pipe to the exhaust manifold **G** uses a spherical seal **F**. This solution simplifies the construction and improves reliability.

EXHAUST LINE SPECIFICATIONS

Engine : CFA

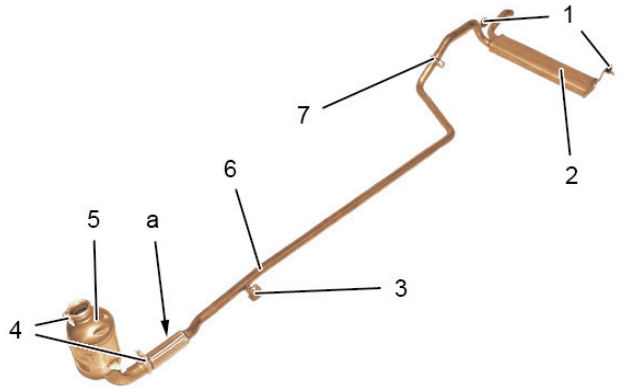


B1J2000D

	(1) Exhaust manifold	(2) Upstream oxygen sensor	(3) Clip	(4) Rear silencer	(5) Downstream oxygen sensor	(6) Screws	(7) Catalytic converter
Tightening (m.daN)	2,4 ± 0,2	4,4 ± 0,4	3,2 ± 0,3		4,4 ± 0,4	4,5 ± 0,4	

EXHAUST LINE SPECIFICATIONS

Engine : 8HT



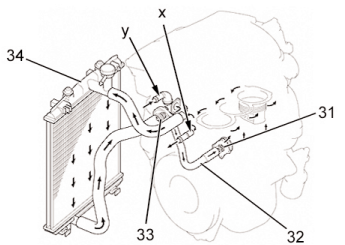
B1J2001D

	(1) Rubber suspension	(2) Silencer	(3) Rubber suspension	(4) Clip	(5) Catalytic converter	(6) Intermediate pipe	(7) Clip
Tightening (m.daN)				2,5 ± 0,2	2 ± 0,2		3,2 ± 0,3
Reference					TR PSA K278		

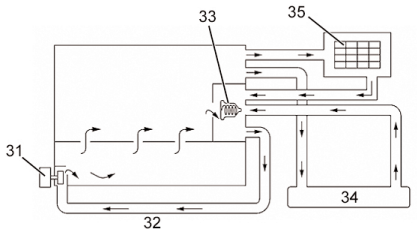
COOLING SYSTEM SPECIFICATIONS		
	1.0i	**1.4 HDi**
Engine type	**CFA**	**8HT**
Capacity	4	4,4
Radiator surface		12,2 dm^2
Pressurisation		1,4 bars
Opening of thermostatic regulator	82°C	
Cooling fan (Triggering threshold)	93°C	97°C
Without aircon	1 x 100 Watt	
With aircon	1 x 300 Watt	
Aircon cut-off		115°C
Alert		118°C
Post cooling		105°C *(for 6 minutes)*
Coolant temperature sensor and alert : located on the coolant outlet housing.		Green connector
Engine coolant level sensor		On the expansion chamber

Temperature sensor : tightening torque **: 2 ± 0,2 m.daN.**

COOLING SYSTEM SPECIFICATIONS



B1B202DD



B1B202ED

Engine : CFA

Cooling circuit

"y" towards the heater unit. **"z"** from the heater unit.
(32) bypass pipe. **(34)** radiator
A thermostat **(33)** with bypass valve is fitted at the inlet end of the coolant pump **(31)** on the cooling circuit.
The engine uses a specific coolant that has very long life.
Specifications :

Thermostat with opening temperature	**: 82°C.**
- Coolant fluid	
Type	: Coolant with very long life for petrol or equivalent engine.
Capacity (litres)	**: 4.**

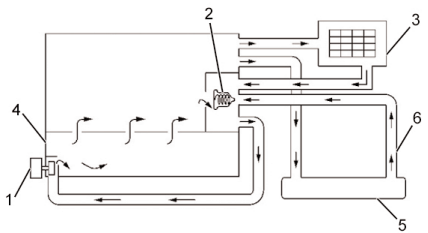
System diagram

(35) heater unit.
Specifications of coolant fluid :

- Type	: Coolant with very long life for petrol or equivalent engine
- Colour	**: Pink.**
- 1st replacement of fluid	**: 150 000 km *(100 000 miles).***
Subsequent replacements	**: Every 60 000 km *(40 000 miles).***

WARNING : The coolant is already a blended product **(50 %** coolant and **50 %** de-ionised water), therefore no further mixing mut be done when topping up or replacing coolant.

COOLING SYSTEM SPECIFICATIONS



B1G200YD

Engine : CFA

(1) Coolant pump.

(2) Thermostat.

(3) Heater matrix.

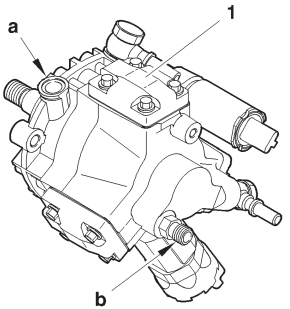
(4) Cylinder block drain screw.

(5) Cooling radiator.

(6) Top hose

COOLING SYSTEM SPECIFICATIONS

Engine : 8HT



B1H200ZD

(1) Bleed screw.

(2) Exhaust gas recycling (EGR) heat exchange (EURO 4 version).

CHECKING THE OIL PRESSURE		
	Petrol	Diesel
Engines	CFA	8HT
Temperature (°C)	90°C	
Pressure (Bars)		1,3
Rpm		1000
Pressure (Bars)	3,7	
Rpm	2000	
Pressure (Bars)		
Rpm		
Pressure (Bars)	5	3,5
Rpm	4000	4000
	Tools	
4386-T	X	
4601-T	X	
1503-L	X	
2279-T.Bis		X
4103-T		X
(-).1503.J		X

NOTE : The oil pressure should be checked with the engine hot, after the oil level has been checked.

VALVE CLEARANCES

CFA petrol engine

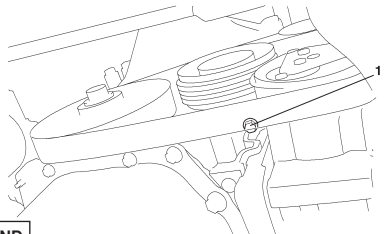
Adjust by change of cam followers (See presentation of 384F engine).

8HT diesel engine

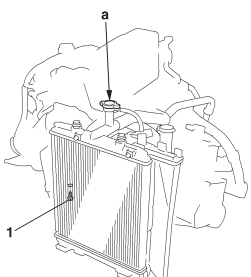
Hydraulic compensator

DRAINING, FILLING AND BLEEDING THE ENGINE COOLING CIRCUIT

Engine : CFA



B1G200ND



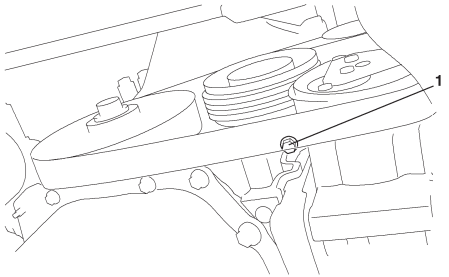
B1G200PD

IMPERATIVE : Respect the safety and cleanliness requirements.
WARNING : To avoid all risk of burns, do not remove the radiator cap while the engine and the radiator are hot. Thermal expansion may cause coolant fluid and steam to escape from the radiator.
Slacken the drain screw **(1)** and drain the coolant fluid.
NOTE : The drain screw **(1)** is situated close to the lower edge of the timing cover.
Remove the radiator cap **«a».**
Uncouple the radiator outlet hose to drain the coolant fluid.
Couple the radiator outlet hose on the engine side.
Refit the drain screw **(1).**
Tightening torque **: 2 ± 0,2 m.daN.**
Fill the radiator with engine coolant fluid until it overflows.
Capacity **: 4 Litres.**
WARNING : Do not replace coolant fluid with water.

NOTE : Use of coolant fluid that is inappropriate may damage the cooling system.
NOTE : Use only **«Toyota Super Long Life Coolant»** engine coolant fluid or any other similar high quality coolant fluid based on ethylene glycol, without silicate, without amine, without nitrite and without borate, but with hybrid organic acid properties that guarantee long life (this type of fluid is a blend of organic acids and phosphates in low concentration).

DRAINING, FILLING AND BLEEDING THE ENGINE COOLING CIRCUIT

Engine : CFA

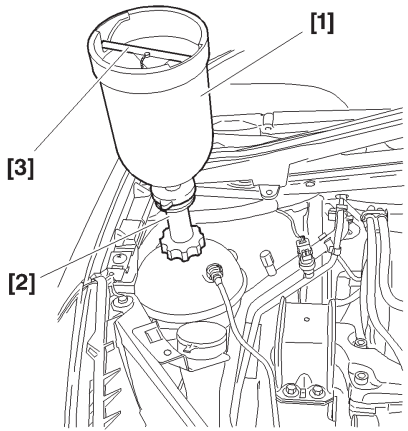


B1G200ND

Press the radiator inlet and outlet hoses several times to test the level of coolant in the radiator. If the level goes down, add more coolant fluid.
Screw the radiator cap **"a"** back on securely.
Slowly pour engine coolant into the expansion chamber up to the maximum mark.
Warm up the engine, until the cooling fan triggers.
Adjust the air conditioning as indicated during the rise in engine temperature.
Manual air conditioning system
Adjust the controls as indicated
Speed of cooling fan : all adjustments except temperature in position **"OFF"** : button turned towards hot air, air conditioning control in position **"OFF"**
Maintain the engine speed between **2000** and **2500 rpm** until the cooling fan triggers.
Press several times on the radiator inlet and outlet hoses several times during the rise in engine temperature.
Stop the engine and wait for the coolant temperature to come down.
If the coolant level is below the maximum mark, repeat the **10 previous stages** until the coolant level is up to add more coolant fluid.
Again check the level of engine coolant in the expansion chamber. If it is below the maximum mark, add more coolant fluid.
Fill the radiator with coolant fluid and fix on it a radiator cap tester.
Pump to obtain a pressure of **1.37 bar** and check that there is no leak.

DRAINING, FILLING AND BLEEDING THE ENGINE COOLING CIRCUIT

Engine : 8HT



B1G200TD

Tools.

[1] Filling cylinder **: 4520-T**
[2] Adaptor for filling cylinder **: 4222-T**
[3] Control rod for filling cylinder **: 4370-T**

Draining

Disconnect the negative terminal of the battery.

Remove the header tank cap with care.

Place a draining tray under the cooling radiator.

Drain the radiator by uncoupling the bottom hose.

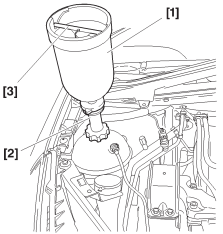
Place a draining tray under the engine.

Drain the engine by removing the plug **(1)**. *(accessible from above the engine)*.

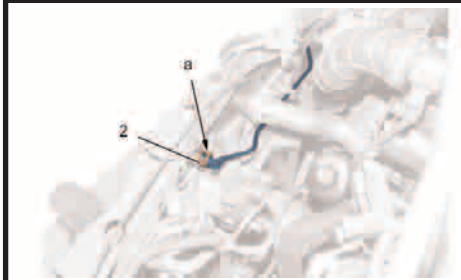
Refit the drain plug **(1)**. *(with a new O-ring seal and clip)*.

DRAINING, FILLING AND BLEEDING THE ENGINE COOLING CIRCUIT

Engine : 8HT



B1G200TD



B1B2013D

Filling and bleeding the circuit

Fit the filling cylinder **[1]**, plug **[3]** and adaptor **[2]** assembly on the filling aperture.

Slowly fill the cooling circuit **[1]** with coolant fluid, up to the **"1 litre"** mark, to pressurise the circuit.

Remove the clip **(2)** from the tube.
Uncouple the tube at **"a"**.
Couple the tube at **"a"** when the fluid flows out clean and without air bubbles.
Reconnect the negative terminal of the battery.

Start the engine.
Maintain an engine speed of **1500 rpm**, up to the first cooling cycle (starting and stopping of the cooling fan).
Plug the filling cylinder **[1]** with the plug **[3]**.
Remove the filling cylinder **[1]**, plug **[3]** and adaptor **[2]** assembly.
Stop the engine and wait for it to cool down.
If necessary, top up the level to the maximum mark (with the engine cold).
Refit the header tank cap.
IMPERATIVE : Carry out the operations that are necessary following a reconnection of the battery (see corresponding operation).

BOSCH ME 7.9.5 INJECTION SPECIFICATIONS

Engine : CFA

Presentation : BOSCH ME 7.9.5 Injection

Introduction

Application.

This principle of operation for injection – ignition applies to the **384F** engine.
the BOSCH injection system satisfies the following norms :
Depollution norm L5
EOBD depollution
NOTE : EOBD : European On Board Diagnosis, for diagnosis of depollution equipment.

Features

Features of the injection system:
This ECU is of the "Engine speed pressure" type
This injection system controls the engine injection and ignition thanks notably to the information on inlet air pressure and engine speed.
Multipoint injection (3 electromechanical injectors)
Sequential injection
Integral electronic ignition

Depollution L5 (European norm EURO4)

Marketing of vehicles respecting the depollution norm **IFL5** (according to country of marketing).
The new depollution norm **L5** is more severe than the previous norm (depollution L4) :
The maximum pollution rate is reduced.
Impregnation of precious metals is increased.

BOSCH ME 7.9.5 INJECTION SPECIFICATIONS

Engine : CFA

System of on-board diagnosis (EOBD)

This diagnostic system informs the driver when the depollution equipment is no longer fulfilling its role.
Faults in the system causing polluting emissions are memorised in the injection ECU.
The **"engine diagnosis**" warning lamp, in addition to its usual functions, signals any faults in the depollution function (EOBD).
NOTE : EOBD : European On Board Diagnosis, for diagnosis of depollution equipment.
The on-board diagnosis system monitors :
- Combustion misfiring
- Efficiency of the catalytic converter
- Deterioration of the oxygen sensors

EOBD requires the installing of an oxygen sensor (downstream of the catalytic converter).

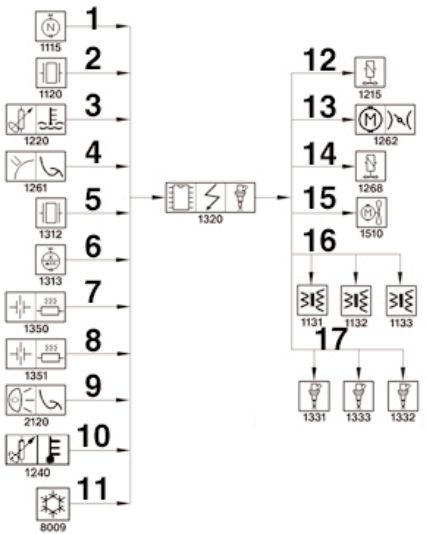
Features

Features of the injection system:
- Engine phase detector : camshaft position sensor
- Camshaft dephaser (VVT)
- Sequential injection
- Air temperature sensor incorporated in the air pressure sensor in the inlet manifold
- Engine cooling function (integral to the injection ECU)
- Dialogue between the injection ECU and the piloted manual gearbox ECU, type MMT : CAN network
- Accelerator pedal sensor incorporated in the accelerator pedal
- Motorised butterfly housing (with the MMT piloted manual gearbox)

Features of the fuel circuit:
- Injection rail without fuel return
- Fuel pump/gauge module with integral fuel filter

GENERAL SYNOPSIS : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA



D4E2002D

GENERAL SYNOPSIS : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA

	Components		Components
1115	Cylinder reference sensor	**1313**	Engine speed sensor
1120	Knock sensor	**1320**	Engine ECU
1131	Ignition coil : cylinder 1	**1331**	Injector : cylinder N°1
1132	Ignition coil : cylinder 2	**1332**	Injector : cylinder N°2
1133	Ignition coil : cylinder 3	**1333**	Injector : cylinder N°3
1215	Canister purge electrovalve	**1350**	Downstream oxygen sensor
1220	Engine coolant temperature sensor	**1351**	Upstream oxygen sensor
1240	Inlet air temperature sensor	**1510**	Cooling fan
1261	Accelerator pedal position sensor *(MMT piloted manual gearbox)*	**2120**	Brake dual-function switch
1262	Motorised butterfly housing	**8009**	Linear pressure sensor for the coolant fluid *(with aircon)*
1268	Variable valve timing electrovalve (VVT)		
1312	Inlet air pressure sensor		

GENERAL SYNOPSIS : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA

Link N°	Signal	Nature of the signal	Link N°	Signal	Nature of the signal
1	Information on the position of the camshaft	Open cycle ratio (OCR)	**11**	Information on the cooling circuit pressure	Analogue
2	Information on the noise of combustion	Analogue	**12**	Control of the canister purge electrovalve	Open cycle ratio (OCR)
3	nformation on the engine coolant temperature		**13**	Control of the motorised butterfly (MMT piloted manual gearbox)	
4	Information on the position of the accelerator pedal		**14**	Control of the variable valve timing electrovalve	
5	Information on the inlet air pressure		**15**	Control of the cooling fan	All or nothing
6	Information on engine speed	Open cycle ratio (OCR)	**16**	Supply of the ignition coils	
7	Information on the oxygen content of the exhaust gases *(after the cat. converter)*	Analogue	**17**	Control of the petrol injectors	
8	Information on the oxygen content of the exhaust gases *(before the cat. converter)*				
9	Information on the brake switch	All or nothing			
10	Information on the inlet air temperature	Analogue			

OPERATING PHASES : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA

Engine management

The engine ECU manages the injection on the basis of the information on engine torque :
The engine ECU calculates the need for engine torque from the accelerator pedal sensor
The engine torque requested takes account of various corrections
The engine torque requested is obtained by acting on the following components :
- Butterfly angle (motorised butterfly housing)
- Ignition advance (knock regulation)
- Injection time

Cycle of ignition and injection

Sequential injection: the injectors are commanded separately in the order of injection (3-2-1), just prior to the inlet phase.
Static ignition: one coil per cylinder.
The ECU manages the injection and the ignition simultaneously (metering of the petrol/air mixture).
The quantity of fuel injected is proportional to the time of opening of the injectors which is determined as a function of 3 main parameters :
- Engine load
- Speed of rotation of the engine (TDC sensor)
- The information from the oxygen sensor

Numerous other corrections are also applied during operation, in order to take account of the variations :
- In the heat status of the engine (coolant temperature sensor)
- In the operating conditions (idle phase, stable phase, full load phase, transitory engine speed phases, injection cut-off phase)
- In the atmospheric pressure (altimetric correction)

Injection.

Correction of starting : engine cold

The injection ECU corrects the flow from the injectors during the action of the starter motor.
This quantity is injected in asynchronous mode, thus constant in time, depending only on the temperature of the coolant fluid.
The engine once started receives an injected quantity, synchronous with the ignition which varies in permanence with its thermal evolution.

OPERATING PHASES : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA

Regulation of the idling speed

The engine is equipped with an idle regulation stepper motor :
Important variations in the engine idling speed due to the different accessories on the vehicles, depending on their operating status (aircon, alternator)
Variations in engine idling speed due to the ageing of the engine
This device enables a progressive return to idling speed.
Role of the idle regulation function:
- To regulate the idling speed
- To obtain a fast idle speed that decreases with the warming up of the engine
- To improve the idling speed for the vehicle in motion

Engine starting

Entry into starting phase occurs as soon as the injection ECU is powered.
During starting the injection ECU commands the following components:
- Priming pump (low pressure) (cut-off after 3 seconds, provided the starter motor has not operated)
- The electrical supply of the oxygen sensors

Functioning of the transitory engine speeds

Command of the injectors is corrected as a function of the following variations:
- Butterfly position
- Pressure in the inlet manifold

The detection of these engine speeds (accelerations/decelerations) is by intermediary of the butterfly potentiometer or of the pressure sensor.
In these operating modes the quantity of fuel injected depends on the variation of the butterfly angle or on the variation of the pressure

Correction for full load

Approaching full load, the air/fuel mixture has to be made richer in order to obtain optimum engine performance.
In the case of a system with an oxygen sensor loop, the information on this is not taken into account by the ECU.
The ECU then controls the injection in open loop.

OPERATING PHASES : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA

Air supply function

Motorised butterfly housing for MMT piloted manual gearbox.

The torque requested by the injection ECU determines an angle of opening of the butterfly:

The angle of opening of the butterfly varies with the demand coming from the driver.

Engine load is commanded by the butterfly housing.

Injection function :

The quantity of fuel to be injected is calculated from the following parameters :

- Position of the accelerator pedal
- Point of engine operation (engine speed, temperatures, pressures)

As a function of the quantity of fuel to be injected, the injection ECU determines the following parameters :

- Start of injection
- Time of injection

The injection ECU draws on the specific strategies for starting and stopping of the engine.

Determination of the quantity of fuel to be injected

The quantity of fuel to be injected is calculated from the demand coming from the driver, provided by the position of the accelerator pedal.

To determine the quantity of fuel to be injected, the injection ECU takes account of the following elements:

- Demand from the driver (after filtering)
- Quantity of air entering the engine (calculation)

The quantity of fuel to be injected is transformed into an injection time.

Cut-off in deceleration

During deceleration with the engine hot, gas butterfly closed (foot off), the injection of fuel is cut off in order to :

- Reduce fuel consumption
- Minimise pollution
- Prevent the temperature of the catalytic converter from rising

OPERATING PHASES : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA

Correction by oxygen sensor
At idling speed, engine hot, stable with partial load, the signal emitted by the sensor causes an adjustment of the flow from the injector, so as to remain on stoechiometric richness **R = 1/15 or lambda = 1.**

Altimetric correction
The mass of air absorbed by the engine varies according to the atmospheric pressure, thus with altitude.
The altimetric corrector takes account of this variation in pressure and proportionally corrects the injection command time (quantity of fuel injected).
This measure of pressure occurs as the ignition is switched on and when the engine is operating at low engine speed.

Ignition function
The ignition advance is determined from the following information :
- Engine speed
- Engine load
- Engine temperature

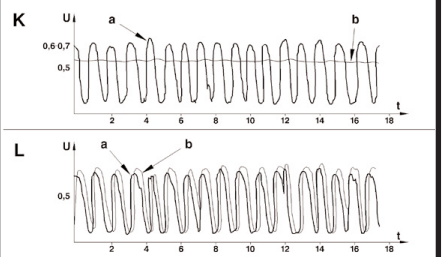
This correction stabilises the engine by varying the advance from one TDC to the next, positively or negatively relative to the mapping value.
Corrections in injection advance are also applied during the transitory phases.
Synchronisation of ignition is achieved by the cylinder reference sensor **N°1.**

Petrol vapour recycling (canister) function
Engine stopped : the electrovalve is closed ; the canister absorbs the fuel vapours coming from the tank.
The electrovalve, piloted by the injection ECU, recycles the petrol vapours stored in the canister.
The quantity of petrol stored in the canister is determined by the injection ECU.
As soon as the canister has to be purged, the ECU temporarily makes the engine operate on a homogeneous mixture.

Overspeed protection
The injection ECU permanently monitors the engine speed.
As soon as the engine speed exceeds the maximum value **(6 400 rpm)**, there is an injection cut-off.

OPERATING PHASES : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA



B1H2029D

EOBD diagnostic function

EOBD : European On Board Diagnosis, for diagnosis of depollution equipment.
This diagnosis informs the driver if the depollution equipment is no longer fulfilling its role.
The on-board diagnosis system monitors :
- Elements of the injection system (polluting emissions, destruction of the catalytic converter)
- The efficiency of the catalytic converter

K : Catalytic converter in good condition.
L : Catalytic converter in poor condition.
"a" : Upstream oxygen sensor.
"b" : Downstream oxygen sensor.

The efficiency of the catalytic converter is determined by comparing the signals coming from the upstream and downstream oxygen sensors.
The detection is performed 6 minutes after the starting of the engine.
Conditions of detection :
- Engine operating for at least 6 minutes
- No fault in the oxygen sensors (downstream oxygen sensor, upstream oxygen sensor)
- No combustion misfirings

Outside the fixed limit, a fault is recorded in the injection ECU and the diagnostic warning lamp comes on.

OPERATING PHASES : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA

Display of faults

The engine diagnosis warning lamp lights up if there is a fault on any of the following components or types of information :

Control of the variable valve timing electrovalve
Inlet air temperature sensor
Engine coolant temperature sensor
Motorised butterfly signal (1,2)
Heating of the upstream oxygen sensor
Heating of the downstream oxygen sensor
Richness regulation
Command of injector for a given cylinder (1,2,3)
Ignition misfiring, cylinder undetermined
Ignition misfiring for a given cylinder (1,2,3)
Knock sensor signal
Engine speed sensor signal
Camshaft sensor
Ageing of the catalytic converter
Vehcle speed sensor signal
Idle stepper motor signal
Supply of sensors
Battery voltage too low
Battery voltage too high
Brake switch signal (MMT gearbox)
Inlet manifold pressure sensor
Signal internal to the ECU
Control of the motorised butterfly (MMT gearbox)
Jamming of the motorised butterfly (MMT gearbox)
Position of the motorised butterfly (MMT gearbox)
Incoherent information coming from the accelerator pedal sensor (MMT gearbox)
Accelerator pedal position sensor signal (**1,2**) (MMT gearbox)
Absence of communication with the immobiliser control module

OPERATING PHASES : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA

Driver's information function

Lighting of engine diagnosis (EOBD) warning lamp

The engine diagnosis warning lamp indicates a failure of a component or of a system relating to emissions if it is causing an increase in emissions, to exceed the legal limits.
Ignition misfirings, which carry the risk of destroying the catalytic converter, cause the engine diagnosis warning lamp to flash.
The engine diagnosis warning lamp is not used for any other purpose, except if there a risk of destruction of the engine or a risk for the safety of the vehicle occupants.

Access to the EOBD fault codes

Access to the memorised fault codes is open to any trained person equipped with a normalised diagnostic tool known as SCANTOOL with which the ECU permits dialogue.
Access to the diagnostic codes is as follows :
Mode 1 : reading of the number of fault codes and of the engine speed (dynamic)
Mode 2 : reading of the fixed datastream (associated variables)
Mode 3 : reading of the fault codes
Mode 4 : deletion of fault codes

OPERATING PHASES : BOSCH ME 7.9.5 INJECTION SYSTEM

Engine : CFA

MMT piloted manual gearbox

The injection ECU dialogues with the automatic gearbox ECU in order to guarantee optimal functioning of the gearbox as well as of the engine.

WARNING : Following any incident concerning the injection, it is essential to read the faults in the injection ECU and the piloted manual gearbox ECU.

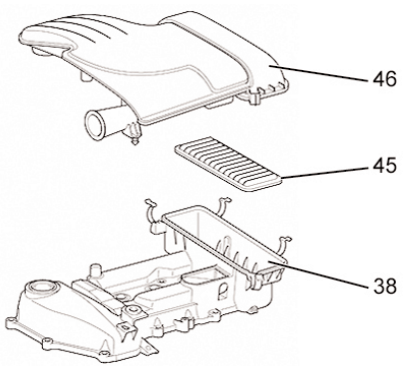
The piloted manual gearbox ECU receives the following information from the injection ECU:
- Engine load (as a function of the position of the accelerator pedal)
- Engine speed
- Engine temperature

The piloted manual gearbox ECU sends the following information from the injection ECU:
- Information on request for torque reduction
- Information on request for compensation of idling speed

Gear changing quality is enhanced by an order to reduce engine torque given by the gearbox ECU to the injection ECU.
When there a change of gear, the gearbox ECU:
- Pilots the engine ECU in terms of engine torque and engine speed in making the change of gear
- Pilots the changing of the gear inside the gearbox

AIR FILTER SPECIFICATION

Engine : CFA



B1B202JD

Air filter

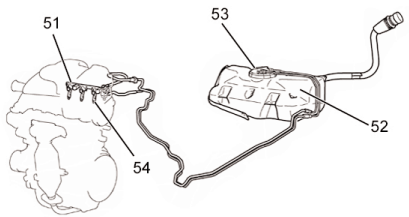
(45) air filter cartridge.

(46) air filter cover.

The valve cover **(1)** incorporating the air filter housing **(38)** is made of plastic to reduce weight.

FUEL SUPPLY SYSTEM SPECIFICATIONS

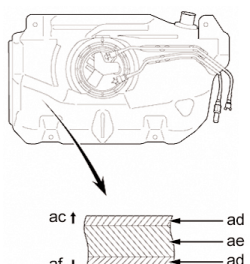
Engine : CFA



B1B202MD

General

Injectors **(54)** with **4 holes** are used in order to enhance the spraying of the fuel.
The non-return fuel supply system reduces emissions by evaporation.
The fuel tank **(52)** is made of plastic.
The fuel pump module **(53)** is compact and light, comprising the fuel gauge which incorporates a carbon fuel vapour absorber.
The fuel supply rail **(51)** is made of plastic..



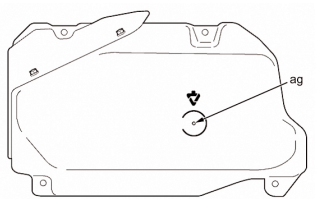
B1B202ND

Fuel tank

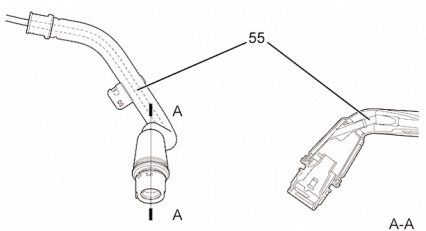
"af" : HDPE (high density polyethylene).
The fuel tank **(52)** is made of plastic. The interior **"ag"** and exterior **"ad"** surfaces are coated with a layer of flourate polyethylene **"ae"** to prevent any penetration of fuel.

FUEL SUPPLY SYSTEM SPECIFICATIONS

Engine : CFA



B1B202PD



B1B202QD

Fuel tank

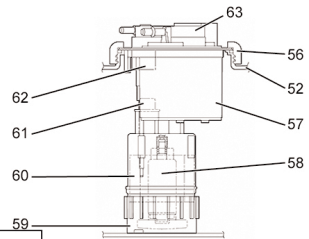
A marking indicates the lowest point of the fuel tank **(52)**. During dismantling (destruction) of the vehicle, drill a hole at the spot indicated "**ah**" in order to drain the fuel.

Fuel filler piping

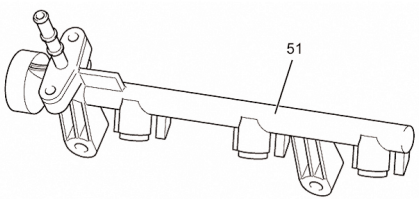
The fuel filler piping **(55)** includes the tank breather pipe for greater compactness and saving of actual space.

FUEL SUPPLY SYSTEM SPECIFICATIONS

Engine : CFA



B1B202RD



B1B202SD

Fuel pump module

(56) : fuel pump stop ring.
(58) : pump.
(59) : reserve cup.
(60) : fuel filter.
(61) : pressure regulator.
(62) : cut-off valve.
(63) : foam filter for venting the canister.

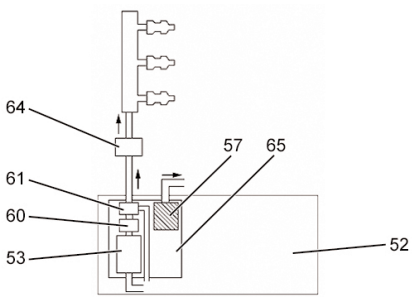
The fuel pump module includes the carbon fuel vapour absorber **(57)** for saving of actual space.

Fuel supply rail

The fuel supply rail **(51)** is made of plastic to reduce weight.

FUEL SUPPLY SYSTEM SPECIFICATIONS

Engine : CFA



B1B202TD

Non-return fuel supply system

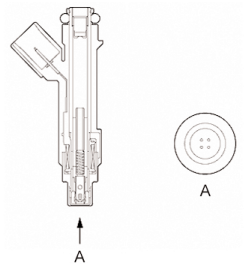
(64) pulse damper.

(65) fuel pump module.

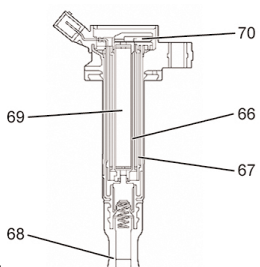
This type of fuel supply system reduces emissions by evaporation. The diagram shows that by integration of the fuel filter **(60)**, the pressure regulator **(61)** and the fuel gauge with the fuel pump **(53)**, there is no return of fuel from the engine and an increase of temperature inside the fuel tank is avoided.

INJECTOR SPECIFICATIONS

Engine : CFA



B1B202UD



B1B202VD

Injectors

Injectors **(54)** with **4 holes** are used in order to enhance the spraying of the fuel.

Ignition system

This is a Direct Ignition System **(DIS)**. It enhances the precision of the point of ignition, reduces the loss of voltage and increases the general reliability of the ignition system thanks to the elimination of the distributor. The direct ignition system **(DIS)** on this engine is an independent ignition system with an ignition coil for each cylinder.

Ignition coil

(66) secondary coil.
(67) primary coil.
(69) iron core.

The DIS system has 3 ignition coils, one for each cylinder.
The caps **(68)** which establish contact with the sparking plugs are integral to the coils.
With a view to simplification of the system, an igniter **(70)** is also incorporated in each coil.

SAFETY REQUIREMENTS : HDi DIRECT INJECTION SYSTEM

Engine : 8HT

SAFETY REQUIREMENTS

Preamble

All interventions on the injection system must be carried out to conform with the following requirements and regulations :
- Competent health authorities.
- Accident prevention.
- Environmental protection.

WARNING : Repairs must be carried out by specialised personnel informed of the safety requirements and of the precautions to be taken

Safety requirements

IMPERATIVE : Take into account the very high pressures in the high pressure fuel circuit (1350 bars), and respect the requirements below :
- No smoking in proximity to the high pressure circuit when work is being carried out.
- Do not work close to flame or sparks.
- Always stay clear of the trajectory of any possible jet of fuel, which could cause serious injuries.
- Do not place your hand close to any leak in the high pressure fuel circuit.
- After the engine has stopped, wait 30 seconds before any intervention.

NOTE : This waiting time is necessary in order to allow the high pressure fuel circuit to return to atmospheric pressure.

Catalytic converter :

Make sure that there are no aerosols or inflammable products in the vehicle boot.

Protect yourself with high temperature gloves.

Connect the vehicle to an approved gas extractor for this type of operation.

SAFETY REQUIREMENTS : HDi DIRECT INJECTION SYSTEM

Engine : 8HT

Cleanliness Requirements

Preliminary operations

IMPERATIVE : The technician should wear clean overalls.

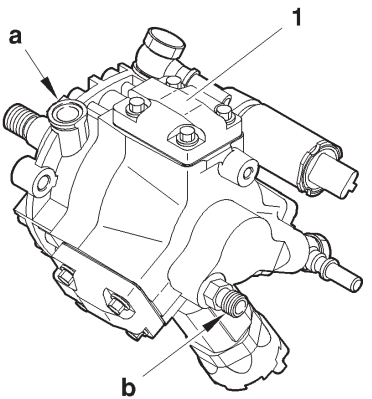
Before working on the injection system, it may be necessary to clean the apertures of the following sensitive components :
(refer to corresponding procedures).
- Low pressure circuit
- Fuel filter
- Fuel gauge
- Unions on fuel pipes
- High pressure circuit
- Fuel high pressure pump
- Fuel high pressure injection common rail.
- Fuel high pressure pipes
- Diesel injector carriers.

IMPERATIVE : After dismantling, immediately block the apertures of sensitive components with plugs, to avoid the entry of impurities.

Work area.
- The work area must be clean and free of clutter.
- Components being worked on must be protected from dust contamination.

PROHIBITED OPERATIONS: HDi DIRECT INJECTION SYSTEM

Engine : 8HT



B1H200ZD

Cleaning

- The use of **high pressure** cleaners is prohibited.

Fuel supply circuit

- Required fuel : diesel.

Electrical circuit

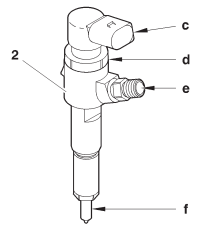
- Swapping injection ECUs between two vehicles will render it impossible to start either vehicle.
- It is forbidden to supply a diesel injector with 12 volts.

Fuel high pressure pump

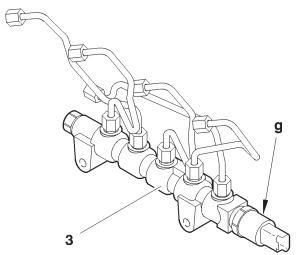
Do not separate the fuel high pressure pump **(1)** from the following components:
- Sealing ring **(a)** (no replacement parts).
- High pressure outlet connector **(b)** (will cause a malfunction).

PROHIBITED OPERATIONS: HDi DIRECT INJECTION SYSTEM

Engine : 8HT



B1H2010D



B1H2011D

Diesel injectors

WARNING: Diesel and ultrasonic cleaners are prohibited.

Do not separate the diesel injector carrier **(2)** from the following components :

- Diesel injector **(f)** *(no replacement parts).*
- Electromagnetic component **(c)** *(no replacement parts).*

Do not move the nut **«d»** *(will cause a malfunction)***.**

Do not separate the union **«e»** from a diesel injector.

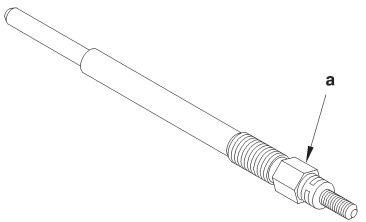
It is forbidden to clean the carbon deposits from the diesel injector nozzle.

Fuel high pressure common injection rail

Do not separate the pressure regulator **"g"** from the common injection rail **(3)** *(will cause a malfunction).*

SPECIFICATIONS : PRE-POSTHEATING CIRCUIT

Engine : 8HT



B1H200YD

The pre-heating time varies as a function of the engine coolant temperature
The pre-postheating control unit is piloted by the engine ECU.

Pre-postheating control unit

Supplier/Reference :

NAGARES	**: 96 456 686 80.**
CARTIER	**: 96 456 692 80.**

Pre-heater plugs

"a"	**: Marking zone.**

Supplier/Reference:

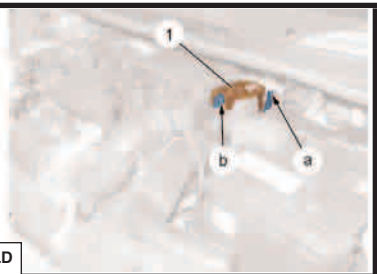
NGK	**: YE04.**
BERU	**: 0 100 276 004.**

Tightening torques (m.daN)

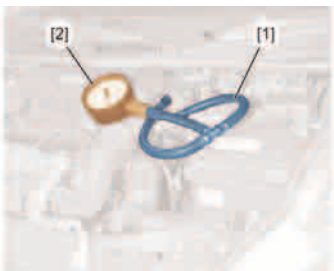
Plugs on cylinder head : tighten to	**: 0,85 ± 0,08 m.daN.**
Bar on plugs : tighten to	**: 0,12 ± 0,03 m.daN.**

CONTROLE : CIRCUIT D'ALIMENTATION CARBURANT BASSE PRESSION

Engine : 8HT



B1B200LD



B1B200MD

Tools.

[1] Ø 10 mm low pressure connector **: 4215-T.**
[2] Pressure gauge for testing boost pressure **: 4073-T.A Toolkit 4073-T**

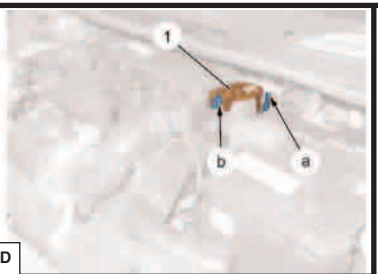
IMPERATIVE : Respect the safety and cleanliness specific to high pressure diesel injection engines.

Disconnect the battery.
Remove the engine cover.

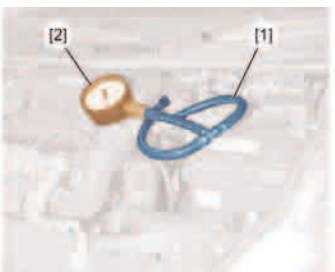
IMPERATIVE : Clean the unons before uncoupling them (if necessary) (see corresponding operation).
Detach the pipe at "a".
Move aside the diesel fuel filter top cover (1).
Checks
Uncouple the clickfit union at "b".
ESSENTIAL : Make sure that the tool [2] is clean.
Link tools **[1]** and **[2]** in series between the fuel high pressure pump and the fuel filter.
Prime the circuit using the manual priming pump so as not to falsify the measurement.
Normal vacuum values :

CHECKS : LOW PRESSURE FUEL SUPPLY CIRCUIT

Engine : 8HT



B1B200LD



B1B200MD

Normal vacuum values:

Vacuum	Observations
10 ± 05 cmhg	Engine driven by the starter motor
20 ± 20 cmhg	Engine running under full load
60 ± 05 cmhg	Supply circuit obstructed *(full tank strainer, piping, fuel filter).*

Refitting

Remove tools **[1]** and **[2]**.

Proceed in the reverse order to removal.

Action the manual priming pump for **120 seconds** in order to prime the fuel circuit.

Checking the sealing

Reconnect the negative terminal of the battery.

Start the engine.

Let the engine run at idle for **2 minutes.**

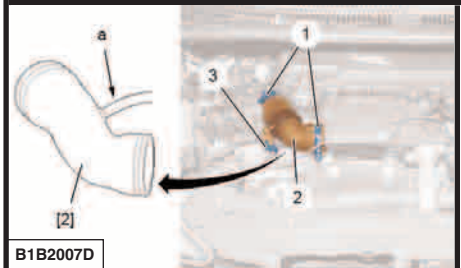
Check that there is no leak.

Check that there are no air bubbles in the return circuit.

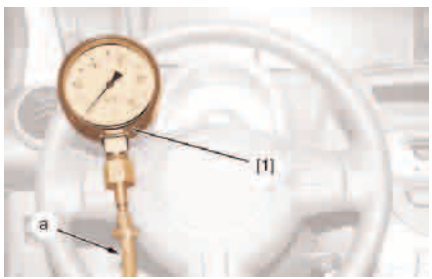
IMPERATIVE : Perform the operations that are required following a battery reconnection *(see corresponding operation).*

CHECKS : TURBO PRESSURE

Engine : 8HT



B1B2007D



C5F2002D

Tools.

[1] Pressure gauge for checking boost pressure	**: 4073-T.A**
[2] Sleeve for checking boost pressure	**: (-).0171.F**
[3] Manual pressure/vacuum pump	**: FACOM DA 16**
[4] Pliers for removing clic clips	**: (-).0172.Z**

IMPERATIVE : Respect the safety requirements.

Checks

IMPERATIVE : Respect the following test conditions:
- Engine at operating temperature, vehicle in running order, engine under full load.

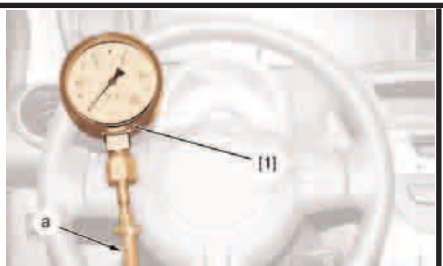
Preparation
Remove the engine cover.

IMPERATIVE : Do not disconnect the air temperature sensor (3).
If the warning lamp in the instrument panel should come on, delete the faults using the diagnostic tool.

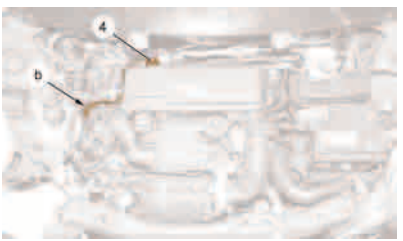
Remove the clips **(1)**.
Move aside the duct **(2)** without disconnecting the air temperature sensor **(3)**.
Fit the tool **[2]** in the place of the duct **(2)**.
Couple the pressure gauge **[2]** on the sleeve **[1]** using the tube **«a»**.

CHECKS : TURBO PRESSURE

Engine : 8HT



C5F2002D



B1B2008D

Mode of operation

Position tool **[1]** in the vehicle.
Start the engine.
Engage first gear, start the vehicle.
Engage the gears up to third gear.
Decelerate to an engine speed of **1000 rpm.**
Check the pressure : **0,6 ± 0,05 bar (1500 rpm).**
Accelerate freely (change from fourth gear to third gear)
Check the pressure: **0,9 ± 0,05 bar** (between 2500 and 3500 rpm).
Remove tools **[1], [2].**
Reposition the tube **(2)**
Tighten the clips **(1).**

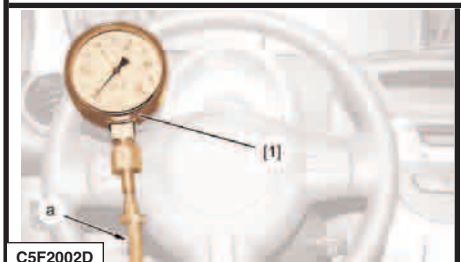
NOTE : Confirm the measurement with the aid of the diagnostic tool (parameter measures).

Parameter measures (diagnostic tool)

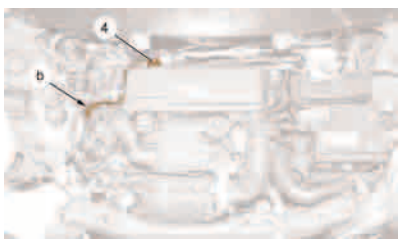
Checks on the inlet manifold pressure sensor
Remove the engine cover.
(4) inlet manifold pressure sensor

CHECKS : TURBO PRESSURE

Engine : 8HT



C5F2002D

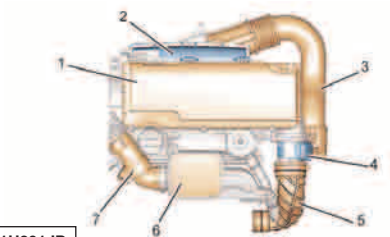


B1B2008D

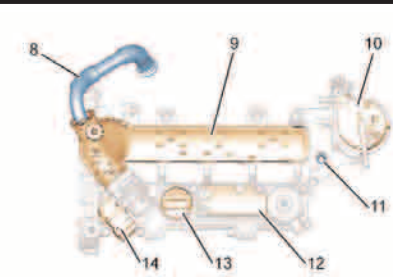
NOTE : The engine has to be switched off.
Uncouple the tube at **"b"** using tool **[4].**
Couple tool **[3]** on the tube at **"b".**
Check the inlet manifold pressure sensor using the diagnostic tool.
Make the following selections in the diagnostic tool :
Menu :
"PARAMETER MEASURES"
"INJECTION INFO"
"TURBO PRESSURE"
Apply a pressure on the pressure sensor by means of tool **[3].**
Check the pressure value in parameter measures by means of the diagnostic tool**.**
Checks
IMPERATIVE : Respect the following test conditions:
- Engine at operating temperature, vehicle in running order, engine under full load.
NOTE : Carry out the checks either during a road test or on a roller test bed.
Perform the checking with the aide of a diagnostic tool.
Start the engine.
Stage A :
Engage first gear, start the vehicle.
Engage the gears up to **third gear.**
Decelerate to an engine speed of **1000 rpm.**
Check the pressure : **0.6 ± 0.05 bar (1500 rpm).**
Stage B :
Accelerate freely (change from fourth gear to third gear)
Check the pressure: **0.9 ± 0.05 bar** (between **2500** and **3500 rpm**).

AIR SUPPLY CIRCUIT SPECIFICATIONS

Engine : 8HT



B1H201JD



B1H201KD

Identification

Upper integrated air inlet manifold

The upper integrated air inlet system is composed of the following components :

(1) Air filter cover
(2) Air filter housing
(3) Air duct
(4) Flowmeter
(5) Turbocharger inlet elbow
(6) Resonator
(7) Turbocharger outlet elbow

Lower integrated air inlet manifold

The lower integrated air inlet system is composed of the following components :

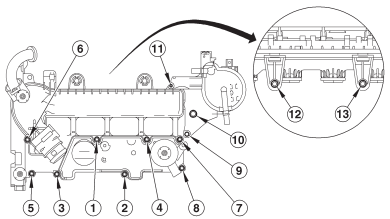
(8) EGR upper pipe
(9) Inlet distributor
(10) Diesel fuel filter with heater and water detector (according to country)
(11) Diesel fuel filter support
(12) Oil separator
(13) Oil filler cap
(14) Air meter housing (EURO 4)

Features

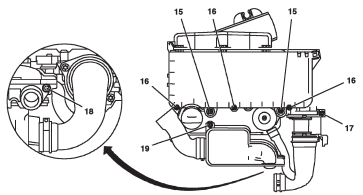
WARNING : At each removal it is essential to replace the seals on the components that have been removed, lubricating the new seals prior to fitting.

AIR SUPPLY CIRCUIT SPECIFICATIONS

Engine : 8HT



B1H201LD



B1H201MD

Tightening torques (m.daN)

Lower integrated air inlet manifold

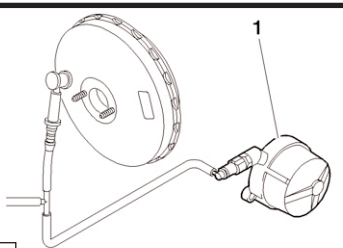
Description	Tightening sequence	Tightening
Oil separator fixing screw	1 to 8	1 ± 0,1
Diesel fuel filter support fixing screw	9 to 10	1 ± 0,1
Diesel fuel filter support fixing screw	11	0,5
Integrated air inlet distributor screw	12 to 13	1 ± 0,1

Upper integrated air inlet manifold

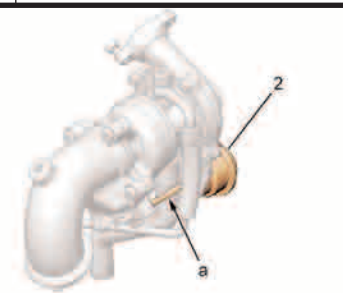
Ref.	Description	Tightening
15	Air filter housing fixing screw	0,5
16	Air filter cover fixing screw	
17	Air inlet neck fixing screw	
18	Screw fixing the resonator on the turbocharger	0,75
19	Screw fixing the resonator on the oil separator	

CHECKING THE AIR SUPPLY CIRCUIT

Engine : 8HT



B1H201GD



B1H201HD

Tools

[1] Manual pressure-vacuum pump **: FACOM DA 16**

IMPERATIVE : Respect the safety and cleanliness requirements.

Checks

Vacuum pump

Connect the tool **[1]** onto the vacuum pump **(1).**
Start the engine.
Wait **30 seconds.**
The vacuum value should be **0.9 ± 0.1 bar** at idling speed.

NOTE : The exhaust gas recycling valve is not linked to the air supply circuit.
The exhaust gas recycling electrovalve is controlled by the engine ECU.

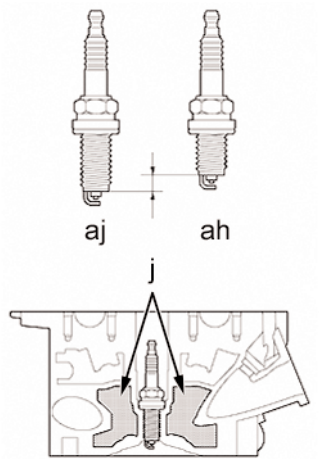
Turbocharging pressure regulation valve

- Connect the tool **[1]** on the valve **(2)** (tube identified by the colour **grey**)..
- Appy a vacuum of approx. **0.8 bar.**
- Rod **"a"** should move **12 ± 2 mm.**

.

SPARKING PLUGS

Engine : CFA



B1B202WD

"ak" conventional type.
The sparking plugs are of the long thread type**"aj**". This permits an increased thickness of the cylinder head in the zone where the sparking plugs are siuated. The coolant liners **"j"** can thus be extended around the combustion chambers to improve cooling.

Specifications :

CITROËN	**: DENSO 596086.**
PEUGEOT	**: DENSO 596085.**
Electrode gap	**: 1,1.**

Charging system

The charging system uses an alternator that is compact and light, but of conventional type.

Specifications :

Type	**: A115I.**
Supplier	**: DMIT.**
Nominal voltage	**: 12V.**
Nominal output voltage	**: 70 A/80 A (*).**
Initial output starting speed	**: 1300 rpm *(maximum).***

Starting system

The starter motor used is of the controlled pinion type.

Specifications :

Type	**: D7E**	**: R70M (*).**
Supplier	**: VALEO**	**: BOSCH.**
Output power	**: 1,0 kW**	**: 1,1 kW.**
Nominal voltage	**: 12V**	**: 12V.**
Weight (grammes)	**: 3000**	**: 2760.**

(*) option.

SPEEDOMETER

An E.E.C. decree of **25 June 1976**, regulates the speed displayed by the speedmeter in relation to the actual speed travelled.

This decree stipulates :

- The speed indicated by a speedometer must never be lower than the actual vehicle speed.
- Between the speed displayed «SD» and the speed travelled «ST», there must always be the following relationship :

ST < SD < 1.10 ST + 4 Kph

Example : For an actual speed of **100 Kph** the speed displayed by the speedometer may be between **100** and **114 Kph.**
The speed indicated by the speedometer may be influenced by :

- The speedometer.
- The tyres fitted to the vehicle.
- The final drive ratio.
- The speedometer drive ratio.

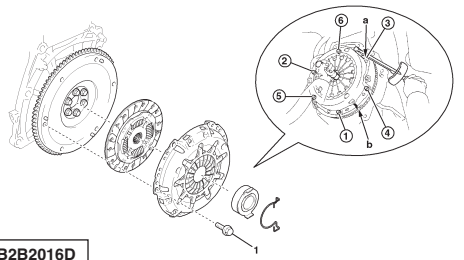
Any of these components can be checked without removing them from the vehicle. (See information note N° **78-85 TT of 19 October 1978**.
NOTE : Before replacing the speedometer, check the conformity of the following points :
- The tyres fitted to the vehicle.
- The gearbox final drive ratio.
- The speedometer drive ratio.

CLUTCH SPECIFICATIONS

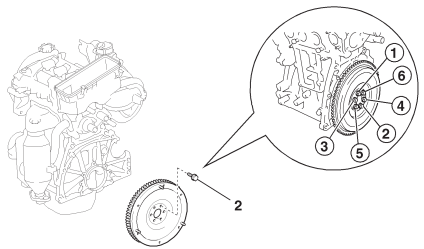
	1.0i		1.4 HDi
Engine type	**CFA**		**8HT**
Gearbox type	MT **(*)**	MMT **(**)**	MT **(*)**
Gearbox make	LUK	ASIN	LUCK
Mechanism /Type			200 CPXV
Ext./Int. lining Ø	181/133	190/133	200/134
Disc lining type			

(*) MT = Manual gearbox
(**) MMT = Piloted manual gearbox

CLUTCH TIGHTENING TORQUES



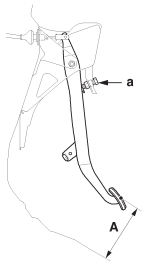
B2B2016D



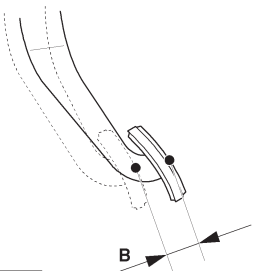
B2B2017D

Tightening torques (m.daN)			
Ref.	**Description**	**Number of screws**	**Tightening**
1	**Screws for clutch mechanism on flywheel**	Align the reference **"b"**	
		Position the mechanism using the top screw **"a"**	
		Tightening	**1,9 ± 0,1**
2	**Screws for flywheel**		**7,8 ± 0,7**

CHECKING AND ADJUSTING THE CLUTCH PEDAL TRAVEL



B2B2000D



B2B2001D

Move aside the floor carpet.

"a" : Pedal height adjustment point.

Height **A** of the pedal in relation to the floor : between **135** and **145 mm.**

Adjust the height **A** of the pedal.

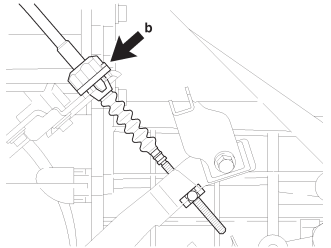
Slacken the locking nut and turn the stop screw until you obtain the correct height.

Tighten the locking nut.

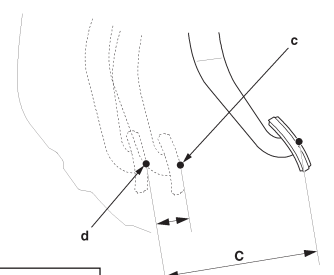
Tightening torque : **2,5 ± 0,2 m.daN.**

Press on the pedal until you feel the start of resistance.
Play **B** in the pedal : **18 to 28 mm.**

CHECKING AND ADJUSTING THE CLUTCH PEDAL TRAVEL



B2B2002D



B2B2003D

Turn the clutch adjustment nut **"b"** until you obtain the correct play **B** in the pedal.

After adjusting the play **B** in the pedal, check the height **A** of the pedal.
Tighten the parking brake lever and fit a wheel chock.
Start the engine and let it run at idle.
Without pressing the clutch pedal, bring the gear lever slowly into reverse gear until the gearing meets a resistance from the clutch.
Progressively press on the clutch pedal and measure the travel from the point where the gear noise disappears (point of release **"c"**) to the position of maximum travel **"d"**.

25 mm or more (from the position of maximum travel **"d"** to the point of release **"c"**

If the travel is not correct, proceed to the following operations:
Check the height **A** of the pedal
Check the play **B** in the pedal
Check the clutch mechanism and disc
Check the travel **C** of the pedal
Travel **C** of the pedal : **148 mm.**

SPECIFICATIONS OF MT (TOYOTA) MANUAL GEARBOX

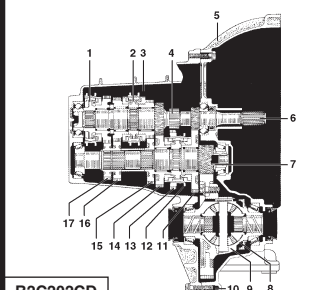
Vehicle	Engine	Gearbox type	Gearbox identification	Torque ratio	Drive ratio
C1	CFA	MT (*)	C 551	20 x 71	
		MMT (**)	C 551.A		
	8HT	MT (*)	C 551		

(*) MT = Manual gearbox

(**) MMT = Piloted manual gearbox

SPECIFICATIONS OF MT (TOYOTA) MANUAL GEARBOX

B2C2011D



B2C202CD

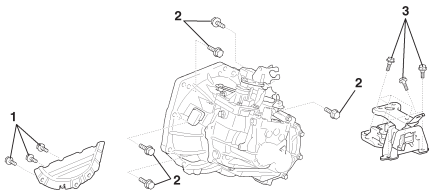
Identification
"a" identification zone for gearbox no.

Reference :

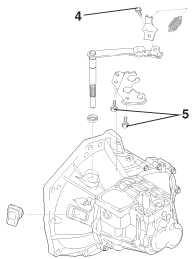
C 551	**: Petrol** engine version
C 552	**: Diesel** engine version

Description
(1) 5th gear synchroniser.
(2) 3rd/4th gear synchroniser.
(3) Gearbox casing.
(4) Reverse gear motor pinion.
(5) Clutch housing.
(6) Primary shaft.
(7) Secondary shaft.
(8) Planet pinions.
(9) Satellite pinions.
(10) Differential gearwheels.
(11) 1st gear driven pinion.
(12) 1st/2nd gear synchroniser.
(13) Reverse gear driven pinion.
(14) 2nd gear driven pinion.
(15) 3rd gear driven pinion.
(16) 4th gear driven pinion.
(17) 5th gear driven pinion.

TIGHTENING TORQUES FOR MT (TOYOTA) MANUAL GEARBOX



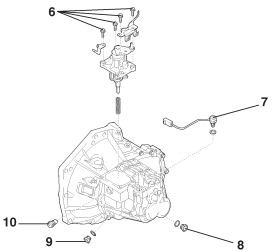
B2C201DD



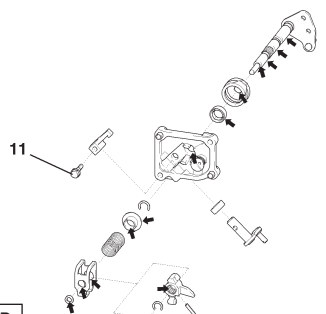
B2C201ED

Tightening torques (m.daN)			
Ref.	**Description**	**Number of screws**	**Tightening**
1	Closing plate fixing		**4 ± 0,4**
2	Fixing of gearbox on engine		**6,4 ± 0,6**
3	Fixing of gearbox support on body		**5,2 ± 0,5**
4	Fixing of clutch fork support		**3,3 ± 0,3**
5	Fixing of gear controls plate		**1,1 ± 0,1**

TIGHTENING TORQUES FOR MT (TOYOTA) MANUAL GEARBOX



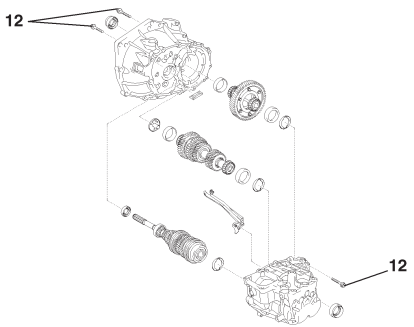
B2C201FD



B2C201GD

Tightening torques (m.daN)			
Ref.	**Description**	**Number of screws**	**Tightening**
6	Fixing of gear controls plate		**1,8 ± 0,2**
7	Reverse gear switch		**4 ± 0,4**
8	Drain plug		**2,9 ± 0,3**
9	Filler plug		**3,9 ± 0,4**
10	Locking finger		**3,7 ± 0,4**
11	Fixing of engagement finger		**1,6 ± 0,2**

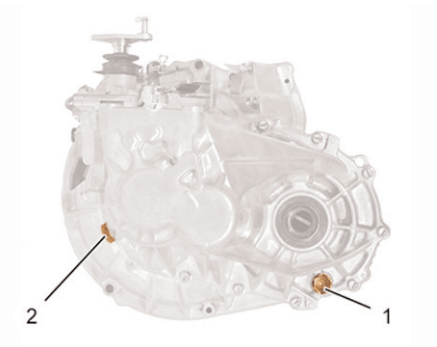
TIGHTENING TORQUES FOR MT (TOYOTA) MANUAL GEARBOX



B2C201HD

Tightening torques (m.daN)			
Ref	**Description**	**Number of screws**	**Tightening**
12	Fixings of gearbox casing and clutch housing	**12**	**2,9 ± 0,3**

DRAINING AND FILLING : MT (TOYOTA) MANUAL GEARBOX



B2C2000D

Presentation

(1) gearbox drain plug.

(2) filler and level plug.

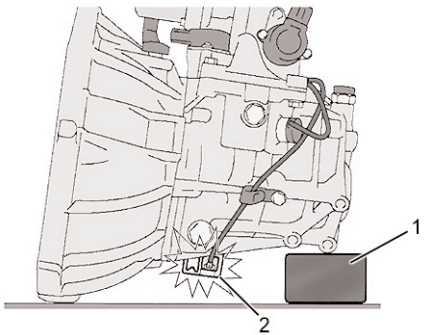
Oil quality

Refer to the manufacturer's instructions.

Oil quality

After draining : **1.7 litres.**

RECOMMENDATIONS / PRECAUTIONS : MMT PILOTED MANUAL GEARBOX



B2C201SD

Safety requirements

ESSENTIAL : Given the special features of the MMT piloted manual gearbox, observe the requirements detailed below.

IMPERATIVE : Always disconnect the battery negative terminal before operating on the actuators (*).

NOTE : (*) After disconnecting the battery, never try to remove the clutch actuator on the vehicle before having checked that it is in the closed position (rod pushed in).

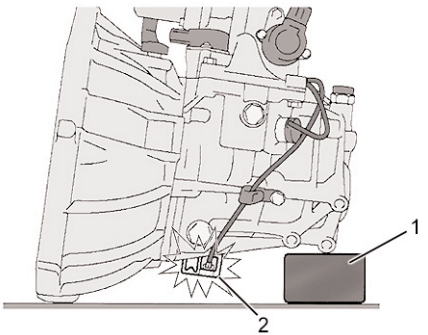
IMPERATIVE : After Sales checks done with the engine running must be performed with «Neutral» engaged and the handbrake on (unless there is a clear mention otherwise in the repair procedures)

IMPERATIVE : The area of movement of the clutch fork must always be kept free during the actuator operating phases.

IMPERATIVE : When initialising the clutch actuator and/or gearbox actuator, do not allow any person to walk or stand in front of the vehicle.

WARNING : When the engine is running, it is forbidden to perform repairs on the clutch and gearbox actuators on the vehicle (whether manually or using a diagnostic tool).

RECOMMENDATIONS / PRECAUTIONS : MMT PILOTED MANUAL GEARBOX



B2C201SD

Repairs on the gearbox

Gearbox removed : position a block **(1)** so as not to damage the gear sensor **(2).**

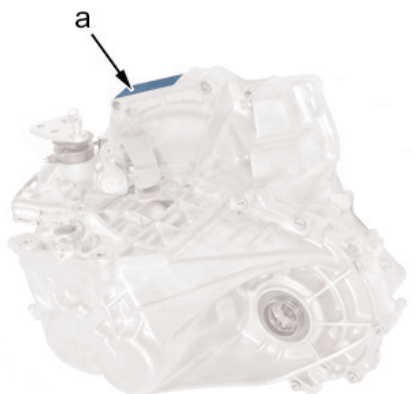
Operations on electrical components :

Do not disconnect :
- The battery when the engine is running.
- The ECU with the ignition switched on.
- The clutch and gearbox actuators with the ignition switched on.

When carrying out electrical checks :
- The battery must be correctly charged.
- Never use a voltage source higher than 16V.
- Never use a warning lamp.
- Never supply an actuator directly.

Before reconnecting a connector, check :
- The condition of the various contacts (for deformation, corrosion etc.)
- The presence and the status of the mechanical unlocking.

IMPERATIVE : Never swap two gearbox ECUs between two vehicles.



B2C201TD

Driving

Never push the vehicle to attempt to start it (impossible with a piloted manual gearbox.

Towing

Conditions for towing:

It is necessary to lift the front of the vehicle to tow it, after having positioned the gear lever in neutral. If there is a gearbox fault or malfunction, the vehicle can remain immobilised depending on the seriousness of the fault.

If a gear is engaged, the conditions for immobilisation of the vehicle are :

Engine stopped (the engine should not be started).

The clutch is open (clutched).

If these conditions are met, you can lift the front of the vehicle to tow it.

If it should not be possibe to lift the front of the vehicle, there are ways to unblock it :

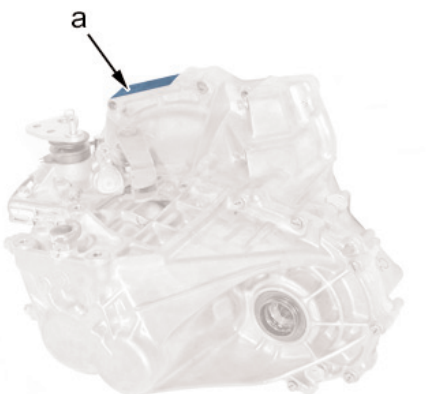
- Engage «N», using a diagnostic tool.
- Engage «N», without using a diagnostic tool.

Engaging of «N», using a diagnostic tool.

Preliminary operations:

- Vehicle and engine stopped
- Battery voltage higher than **12.5 volts**
- Ignition switched on.
- Gear selector on position **"N"**
- Connect the diagnostic tool to the vehicle's diagnostic socket.

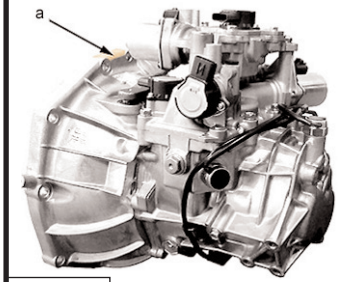
RECOMMENDATIONS / PRECAUTIONS : MMT PILOTED MANUAL GEARBOX



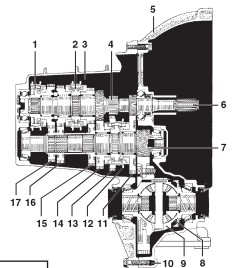
B2C201TD

From the diagnostic tool menus, select :
« DIAGNOSIS »
MMT piloted manual gearbox.
Actuator test.
Gearbox actuator test.
Engage N (neutral).
NOTE : The letter **«N»** should appear on the instrument panel. If not, see the following solution:
Engaging of **«N»**, without using a diagnostic tool..
Engaging of «N», without using a diagnostic tool.
In this configuration, the gearbox actuator is blocked, gear engaged.
NOTE : This recovery solution is to be used solely in a case where the attempt to make the gearbox actuator engage **b** via the diagnostic tool has failed.
Preliminary operation:
Disconnect the battery negative terminal.
Remove the plug on the gearbox actuator.
"a" neutral.
"b" 1st, 3rd, 5th.
"c" 2nd, 4th, reverse gear.
Using a large screwdriver, move the screw **(3)** to place the gearbox actuator in the neutral position.
When this position is reached, position **"N"** is engaged.

SPECIFICATIONS OF MMT (TOYOTA) PILOTED MANUAL GEARBOX



B2C201JD

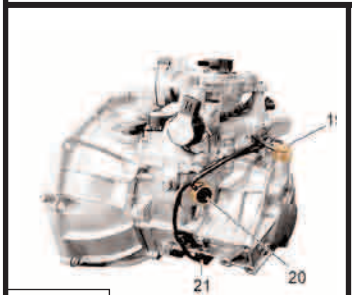


B2C2012D

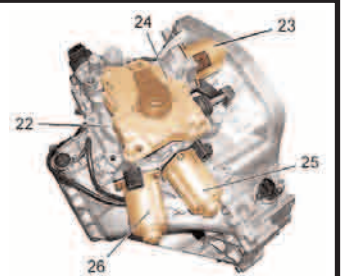
Identification
"a" gearbox no. identification zone.
Ref. **C 551**-A (piloted).

Presentation
(1) 5th gear synchroniser.
(2) 3rd/4th gear synchroniser.
(3) Gearbox casing.
(4) Reverse gear motor pinion.
(5) Clutch housing.
(6) Primary shaft.
(7) Secondary shaft.
(8) Speedometer.
(9) Planet pinions.
(10) Satellite pinions.
(11) Differential gearwheels.
(12) 1st gear driven pinion.
(13) 1st/2nd gear synchroniser.
(14) Reverse gear driven pinion.
(15) 2nd gear driven pinion.
(16) 3rd gear driven pinion.
(17) 4th gear driven pinion.
(18) 5th gear driven pinion.

SPECIFICATIONS OF MMT (TOYOTA) PILOTED MANUAL GEARBOX



B2C201KD



B2C201LD

Description

(19) Reversing lamps sensor.

(20) Gear engaged sensor.

(21) Gearbox input speed sensor.

(22) Gearbox actuator.

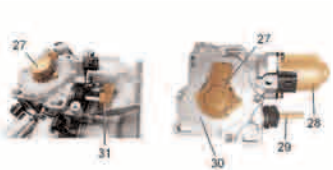
(23) Electric motor for clutch actuator.

(24) Clutch actuator.

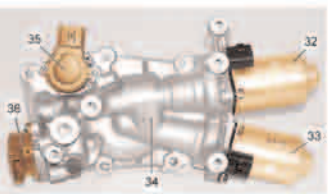
(25) Electric motor for gearbox actuator selection.

(26) Electric motor for gearbox actuator engagement.

SPECIFICATIONS OF MMT (TOYOTA) PILOTED MANUAL GEARBOX



B2C201MD



B2C201ND

Clutch actuator

Description
(27) Declutch angular sensor.
(28) Electric motor for clutch actuator.
(29) Push rod.
(30) Clutch actuator body.
(31) Declutch fork.

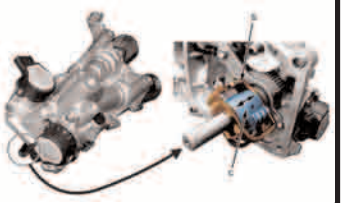
Features

IMPERATIVE : Before each removal and after each refitting of the gearbox actuator, use a diagnostic tool to perform an initialisation (see corresponding operation).

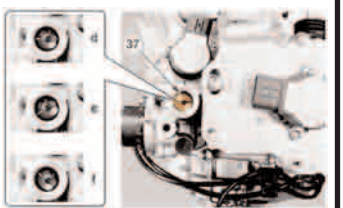
IMPERATIVE : At each refitting of the clutch actuator, perform a position adjustment (pre-loading) (see corresponding operation).

Gearbox actuator
Description
(32) Electric motor for gearbox actuator selection.
(33) Electric motor for gearbox actuator engagement.
(34) Gearbox actuator body.
(35) Engagement angular sensor.
(36) Selection angular sensor.

SPECIFICATIONS OF MMT (TOYOTA) PILOTED MANUAL GEARBOX



B2C201PD



B2C201QD

"b" Selection.
"c" Engagement.

Features

IMPERATIVE : Perform an initialisation of the gearbox actuator after refitting (see corresponding operation).

(37) Gear engagement screw.

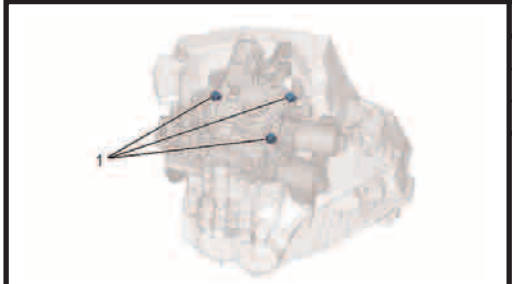
"d" Neutral.
"e" 1st, 3rd, 5th.
"f" 2nd, 4th, Reverse.

IMPERATIVE : Before refitting a gearbox actuator, check that it is in "neutral" position.

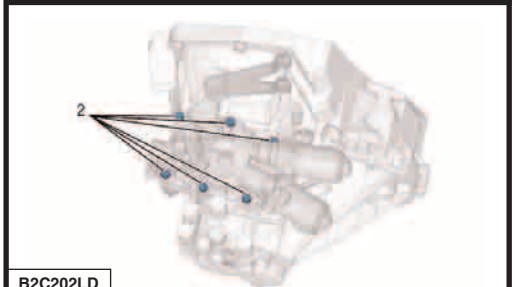
Piloted manual gearbox ECU

The gearbox ECU decides on the changing of gear.
It is located in the vehicle dashboard on the front LH side.

TIGHTENING TORQUES FOR MMT (TOYOTA) PILOTED MANUAL GEARBOX



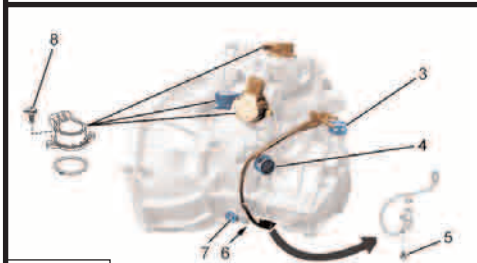
B2C202KD



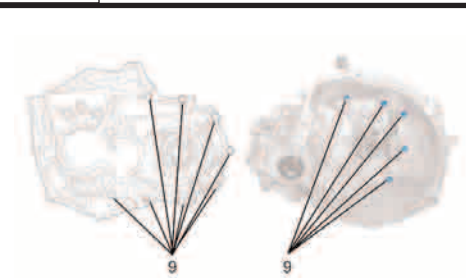
B2C202LD

Tightening torques (m.daN)			
Ref.	**Description**	**Number of screws**	**Tightening**
1	Clutch actuator fixing screws	3	**1,7 ± 0,1**
2	Gearbox actuator fixing screws	6	**1,8 ± 0,1**

TIGHTENING TORQUES FOR MMT (TOYOTA) PILOTED MANUAL GEARBOX



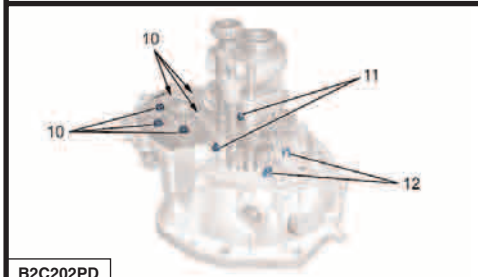
B2C202MD



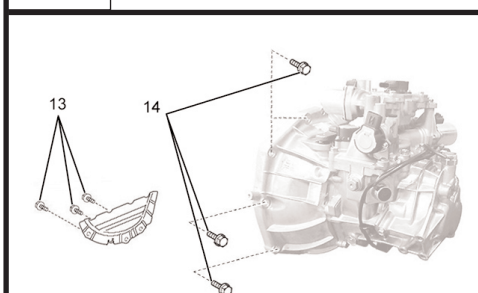
B2C202ND

Tightening torques (m.daN)			
Ref.	**Description**	**Number of screws**	**Tightening**
3	Reversing lamps sensor	1	**4 ± 0,4**
4	Gear engaged sensor		
5	Fixing screw for gearbox input speed sensor		**0,8 ± 0,1**
6	Drain plug		**2,9 ± 0,3**
7	Oil level plug		**3,9 ± 0,4**
8	Angular sensor fixing screw	6	**0,2**
9	Fixing screw for clutch housing on gearbox casing	13	**2,9 ± 0,3**

TIGHTENING TORQUES FOR MMT (TOYOTA) PILOTED MANUAL GEARBOX



B2C202PD



B2C202QD

Tightening torques (m.daN)			
Ref.	**Description**	**Number of screws**	**Tightening**
10	Differential gearwheel fixing screws	6	**12,4 ± 1,2**
11	Fork fixing screws	2	**1,6 ± 0,2**
12	Fixing screw for reverse gear shaft plate		**1,7 ± 0,2**
13	Closing panel fixing screw	3	**4 ± 0,4**
14	Fixing screw for coupling of engine on gearbox	4	**6,4 ± 0,6**

DRIVESHAFTS - GEARBOX

			Tightening torques (m.daN)		Gearbox oil seal mandrels		
Vehicles	Gearbox	Engines	Driveshaft bearing	Driveshaft nut	RH side	LH side	Toolkit
C1	MT	CFA		21,6 ± 0,5	(-).0345.A	(-).0345.B	
	MMT						
	MT	8HT					

Tightening torque (m.daN) for wheel bolts : C1 = 10 m.daN.

WHEELS AND TYRES

Standard fit

Engines	Tyres (Circumference)	Rims	Wheels	Spare wheel		
				Tyre	Rim	Wheel
All types	155/65 R14 75T 1,699 m	Steel	4 1/2 J14 H2	155/65 R14 75T 1,699 m	Steel	4 1/2 J14 H2

Inflation pressures

Normal operating pressure				Pressure under load (maximum)			
Tyre dimensions	Pressure (Bars)			Tyre dimensions	Pressure (Bars)		
	Front	Rear	Spare wheel		Front	Rear	Spare wheel
155/65 R14 75T	2,2	2,2	2,6	155/65 R14 75T	2,3	2,3	2,6

Tightening torques

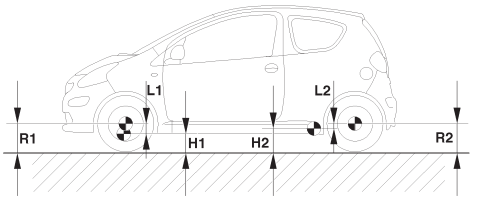
Tighten the wheel bolts to **10 m.daN.**

AXLE GEOMETRY

Conditions for checking and adjusting

Tyres inflated to correct pressures. Vehicle at reference height.
Steering rack locked at mid point *(see corresponding operation).*

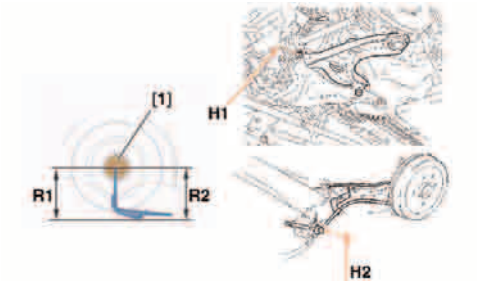
Vehicle heights at reference height



B3B200ED

Front height	Rear height
L1	**L2**
H1 = R1 - L1	**H2 = R2 - L2**
H1 = Measurement between the measuring zone underneath the front subframe and the ground. **R1** = Front wheel radius under load. **L1** = Distance between the wheel axis and the measuring zone underneath the front subframe.	**H2** = Measurement between the measuring zone underneath the rear sill and the ground. **R2** =Rear wheel radius under load. **L2** = Distance between the wheel axis and the measuring zone underneath the rear sill.

AXLE GEOMETRY



B3B200DD

Measuring front height		Measuring rear height	
[1] Gauge for measuring the wheel radius, 4 bolts, tool **4801-T**			
Value at reference height **(+ 6 - 8 mm)**	**L1 = 88 mm**	Value at reference height **(+ 10 - 6 mm)**	**L2 = 22 mm**

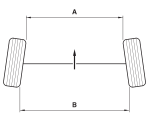
Compress the suspension to obtain the calculated values.
The height difference between the two axle dimensions should be less than **10 mm**.

AXLE GEOMETRY

Front axle	Rear axle
Dissymmetry of lower castor at **0°30'.** Dissymmetry of lower camber at **0°30'.**	Dissymmetry of lower camber at **0°30'.**

All Types

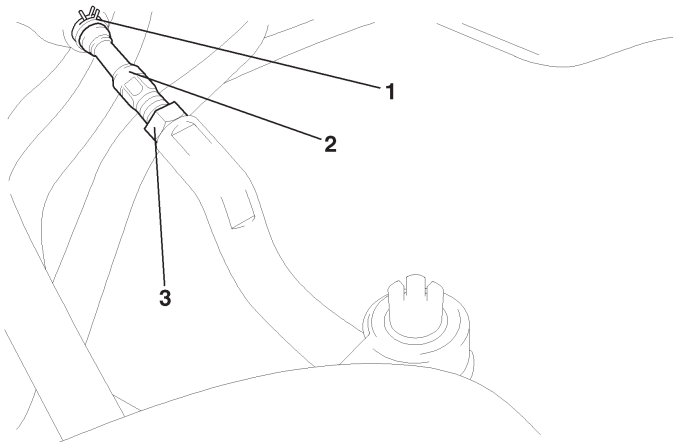
		CFA - 8HT				CFA - 8HT	
Tyres		155/65 R 14					
Vehicule		**Tracking**	**Castor ± 0° 18'**	**Camber ± 0° 30'**	**Pivot angle ± 0° 30'**	**Tracking**	**Camber**
		Adjustable	**Non adjustable**			**Non adjustable**	
All types	mm	**0 ± 2**				**3,6 ± 2,2**	
	0°	**0° ± 0°12'**	**2°47'**	**0°47'**	**9°33'**	**0°24' ± 0°15'**	**0°53'**
Angle of steering full lock		**38° 55' ± 2°**					



B3C200SD

	NOTE	
A < B = Positive figure :	+ =	TOE-IN
A > B = Negative figure :	- =	TOE-OUT

SPECIAL FEATURES : FRONT AXLE



B3B200FD

Tracking adjustment

IMPERATIVE : Distribute the total tracking value symmetrically between the LH wheel and the RH wheel.

Remove the clip **(1).**

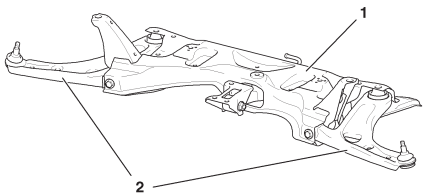
Slacken the nut **(3).**

Adjust the rod **(2).**

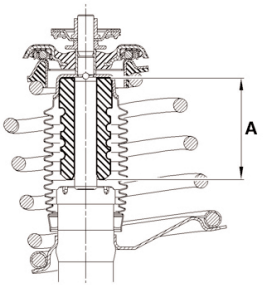
Tighten the nut **(3)** **: 4,7 ± 0,4 m.daN.**

Refit the clip **(1).**

SPECIFICATIONS : FRONT AXLE



B3C200UD



B3C200VD

Subframe
(1) subframe.
(2) suspension arm.

Subframe in two steel shells, fixed by means of six screws on the body, with a yoke for the lower engine suspension rod and lateral yokes (2 LH + 2 RH) for the suspension arm fixings.

The two rear fixing points for the subframe, under the floorpan, are via two link brackets (LH/RH) welded on the subframe.

Pivot.

Pivot type	: **"pinched".**
Pivot bearing diameter	: **69 mm**
Bearing with double row of balls, with integral magnetic wheel	

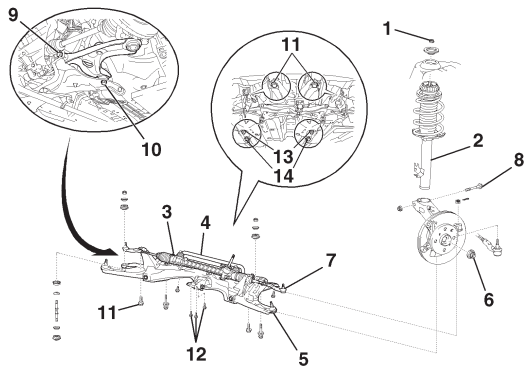
Suspension leg

Front suspension with independent wheels, type pseudo	: **"Mac Pherson".**
Travel stop	: **height A96 mm.**

Anti-roll bar

All engine types	: **Ø 22 mm**

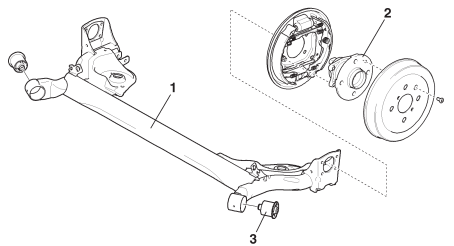
TIGHTENING TORQUES : FRONT AXLE



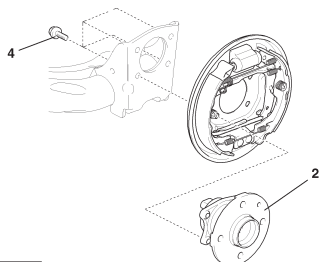
B3C2010D

Tightening torques (m.daN)		
Ref.	**Description**	**Tightening**
1	Damper upper cup fixing nut	**5,5 ± 0,5**
2	Damper	
3	Anti-roll bar bearing fixing	**1,8 ± 0,2**
4	Anti-roll bar	
5	Pivot lower ball-joint nut	**9,8 ± 1**
6	Hub nut	**21,6 ± 2**
7	Steering ball-joint on pivot	**3,3 ± 0,3**
8	Suspension leg fixing on pivot	**4,8 ± 0,5**
9	Suspension lower arm screw	**11 ± 1,1**
10	Suspension lower arm screw	**12,8 ± 1,2**
11	Screw – fixing of subframe on body	**8,5 ± 0,8**
12	Screw – torque reaction rod on body	**5,2 ± 0,5**
13	Screw - fixing of subframe on body	**12,8 ± 1,2**
14	Screw - fixing of subframe on body	**4,8 ± 0,5**

SPECIFICATIONS : REAR AXLE



B3D200DD



B3D200ED

Rear axle.

(1) Rear axle crossmember.
(2) Rear hub.
(3) Rear axle rubber bush.

Machine-welded rear axle, of trailing arm type with deformable axle crossmember.

Engines all types

Thickness of crossmember panel **: 5,5 mm**

Rear hub

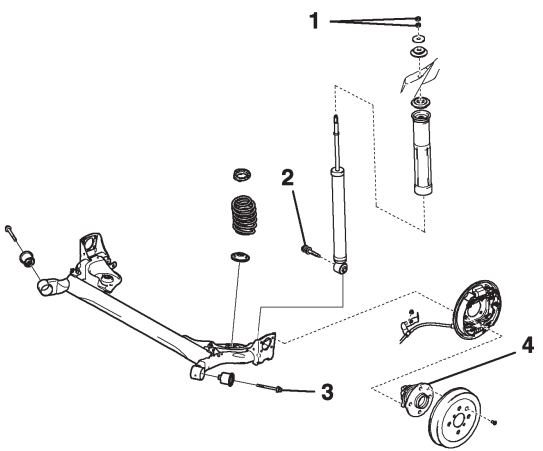
(2) Rear hub.

Union on rear axle, fixing **4 screws (4).**

Vehicle geometry

NOTE : The geometry specifications are given with the values for checking and adjusting the axle geometries.

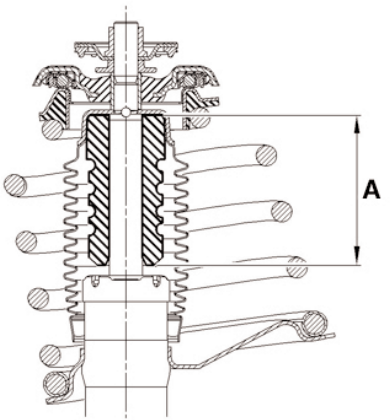
TIGHTENING TORQUES : REAR AXLE



B3D200FD

Tightening torques (m.daN)		
Ref.	**Description**	**Tightening**
1	Damper upper fixing	**2,5 ± 0,2**
2	Damper lower fixing	**4,8 ± 0,4**
3	Fixing of yoke on rear axle	**12,3 ± 1,2**
4	Fixing of rear hub on rear axle	**6 ± 0,6**

SUSPENSION SPECIFICATIONS



B3C200VD

Front axle

Anti-roll bars
Engines all types **: 22 mm**

Travel stop
Travel stop height A **: 96 mm.**

Rear axle
Rear axle crossmember
Machine-welded rear axle, of trailing arm type with deformable axle crossmember.
Engines all types **: 5,5 mm**

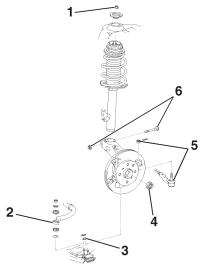
Suspension spring
During a repair on a suspension spring.

IMPERATIVE : Check the presence and condition of the rubber protections on the fixed and sliding cups of the spring compressor.

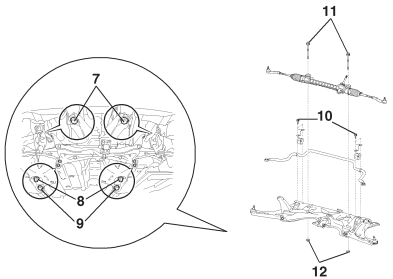
IMPERATIVE: Do not put a suspension spring in direct contact with a metallic object or tool.

IMPERATIVE: Check the condition of the suspension springs (absence of signs of impacts, scratches or rust spots). The paint coating on the suspension springs should not be damaged, no bare metal.

SUSPENSION TIGHTENING TORQUES



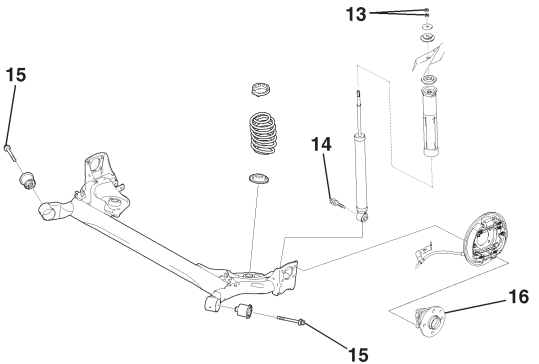
B3B200MD



B3B200ND

Tightening torques (m.daN)		
Ref.	**Description**	**Tightening**
1	Damper upper cup fixing nut	**5,5 ± 0,5**
2	Anti-roll bar fixing	**1,8 ± 0,2**
3	Pivot lower ball-joint nut	**9,8 ± 0,9**
4	Hub nut	**21,6 ± 2,1**
5	Steering ball-joint on pivot	**3,3 ± 0,3**
6	Suspension leg fixing on pivot	**4,8 ± 0,4**
7	Screw fixing subframe on body	**8,5 ± 0,8**
8	Screw fixing subframe on body	**12,8 ± 1,2**
9	Screw fixing subframe on body	**4,8 ± 0,4**
10	Anti-roll bar bearing fixing on subframe	**1,8 ± 0,1**
11	Screws – steering mechanism on subframe	**8,7 ± 0,8**
12	Indexed nuts - steering mechanism on subframe	

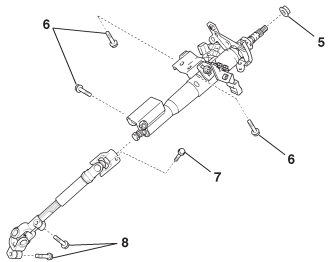
SUSPENSION TIGHTENING TORQUES



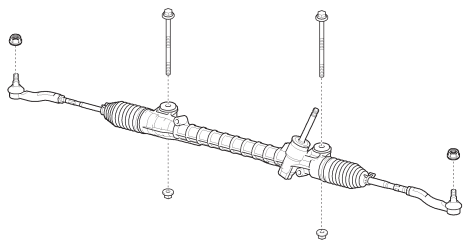
B3D200GD

Tightening torques (m.daN)		
Ref.	**Description**	**Tightening**
13	Damper upper fixing	**2,5 ± 0,2**
14	Damper lower fixing	**4,8 ± 0,4**
15	Fixing of rear axle on body	**12,3 ± 1,2**
16	Fixing of rear hub on rear axle	**6 ± 0,6**

MANUAL STEERING SPECIFICATIONS



B3E2006D



B3E200WD

Manual steering

(5) steering wheel fixing.

(6) fixing of steering column on support.

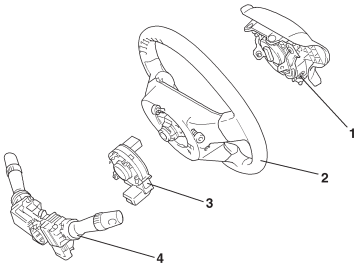
(7) fixing of upper steering cardan.

(8) fixing of lower steering cardan.

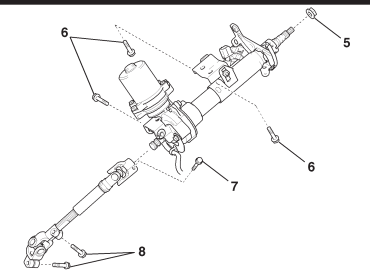
Steering mechanism

Number of turns of the steering wheel	**: 3,27**
Steering rack travel (mm)	**: 2 x 70,2**
Steering ratio	**: 1/43**
Inside angle of full lock	**: 36°55' to 40°55'**
Outside angle of full lock	**: 32°23'**

POWER STEERING SPECIFICATIONS



B3E2004D



B3E2005D

Top of column

(1) driver's airbag.

(2) steering wheel.

(3) rotary switch.

(4) controls under steering wheel.

Steering column

Electric power steering

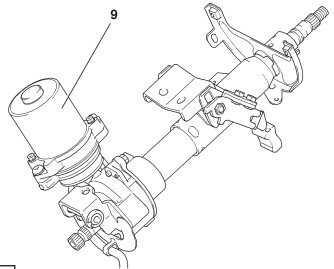
(5) steering wheel fixing.

(6) fixing of steering column on support.

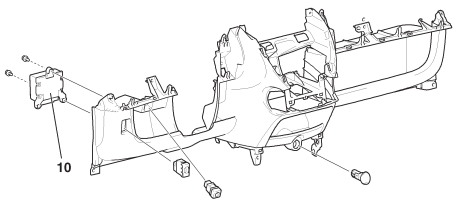
(7) fixing of upper steering cardan.

(8) fixing of lower steering cardan.

POWER STEERING SPECIFICATIONS



B3E200XD



B3E200YD

Steering assistance

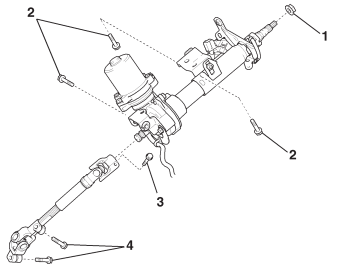
Supplier : **KOYO.**
Electric motor : **33 A.**
The steering assistance is provided by the electric assistance motor **(9)**, controlled by an ECU.
Power delivered to the electric assistance motor **(9)** depends on:
- Vehicle speed.
- Engine speed.
- Torque applied on the steering wheel.

Electric power steering ECU

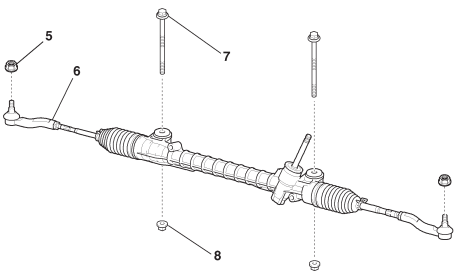
Only one ECU version, whatever the engine-type.
The electric power steering ECU **(10)** is linked to the following connectors:
- Electric assistance motor supply.
- Electric power steering ECU supply.
- Signals from the torque sensor.
- Information on engine speed and vehicle speed

NOTE : After changing the electric power steering ECU, it is necessary to perform a configuration *(see corresponding operation).*

POWER STEERING TIGHTENING TORQUES



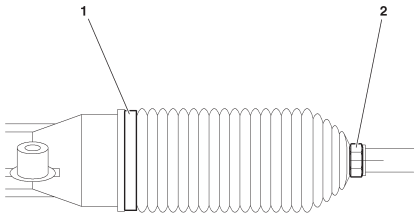
B3E2002D



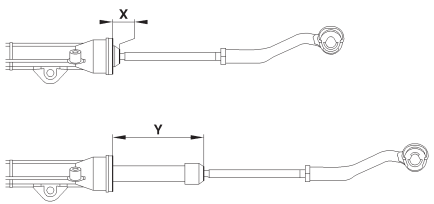
B3E2003D

Tightening torques (m.daN)		
Ref.	**Description**	**Tightening**
1	Steering wheel fixing	**5 ± 0,5**
2	Fixing of steering column on support	**2,5 ± 0,2**
3	Fixing of upper steering cardan	**3,5 ± 0,3**
4	Fixing of lower steering cardan	**3,5 ± 0,3**
5	Fixing of ball-joint on pivot	**3,3 ± 0,3**
6	Locking nut for adjusting the steering track rods	**4,7 ± 0,4**
7	Fixing of mechanism on subframe	**8,9 ± 0,8**
8	Fixing of mechanism on subframe (indexed nut)	

SETTING THE STEERING RACK MID-POINT



B3E2000D



B3E2001D

IMPERATIVE : Respect the precautions that must be taken prior to a repair.

Preliminary operation

Raise and support the vehicle on a **2-column** lift.
Remove the clips **(1)** and **(2).**
Detach the steering rack protection gaiter.

Setting

Turn the steering wheel to full LH lock.
Measure the dimension **X.**
Turn the steering wheel to full RH lock.
Measure the dimension **Y.**
Calculate the dimension **L = (Y - X) : 2.**
Position the steering rack to the dimension **"L"** (steering rack mid-point).

Additional operation

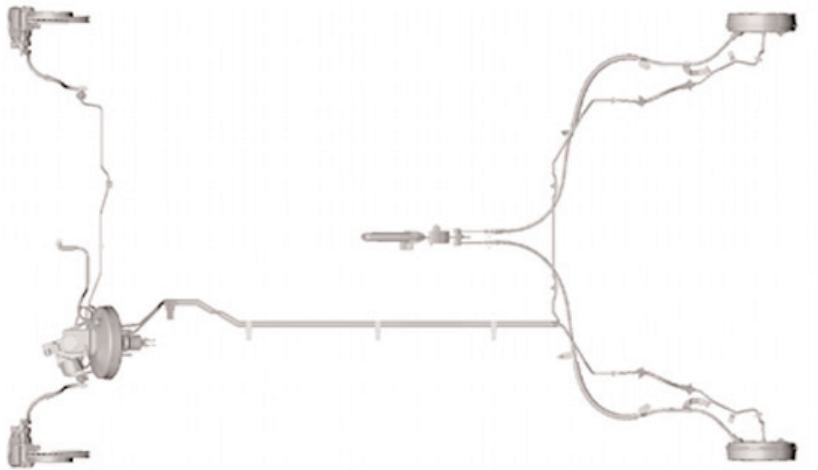
Refit the protection gaiter.
In order to be able to fit the clip **(1)**, remove :
- The steering ball-joint gudgeon pin
- The steering ball-joint nut.

Uncouple the steering ball-joint from the pivot.
Fit a new clip **(1).**
Refit :
- The clip **(2)**
- The new clip **(1)**
- The steering ball-joint
- The steering ball-joint nut
- The steering ball-joint gudgeon pin

BRAKE SPECIFICATIONS

				1.0i	1.4 HDi
Engine type				CFA	8HT
FT	Ø mm	Master Cylinder		20,64	
		Master vac		228,6	
		Caliper make / piston		BOSCH 48	
		Disc	Plain		
			Ventilated	247	
	Disc thickness/minimum thickness			20/18	
	Brake pad supplier / grade			JURID 682	
	Ø mm	Drum Original/maximum/width		200/201	
	Lining supplier / grade			FERODO 3627 F	

BRAKE SPECIFICATIONS



B3F201ZD

Braking system

Braking circuit in the form of an **X.**

Ventilated disc brakes at the front, drum brakes at the rear.

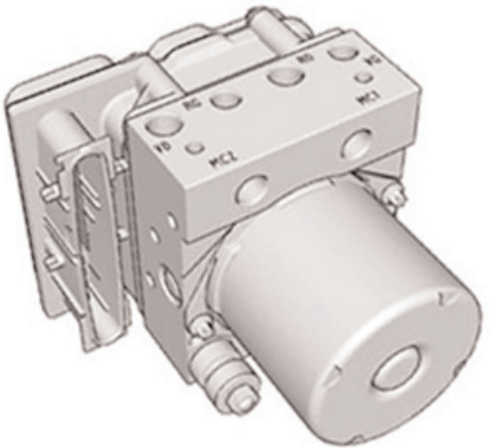
NOTE : The front brake pads have no wear warning lamp.

Handbrake lever controlled by cables acting on the rear wheels.

The compensator and main brake limiter functions are assured by the **ABS REF systems.**

NOTE : REF = Electronic Brakeforce Distribution (EBD.

BRAKE SPECIFICATIONS



B3F2020D

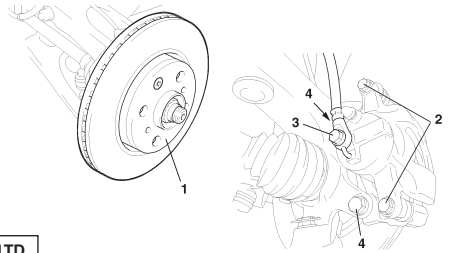
Hydraulic valve block

Make	**: BOSCH.**
Type	**: ABS REF 8.0.**

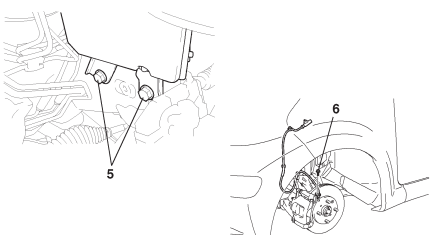
Installed on the master cylinder

TIGHTENING TORQUES : BRAKES

Front brakes



B3F201TD



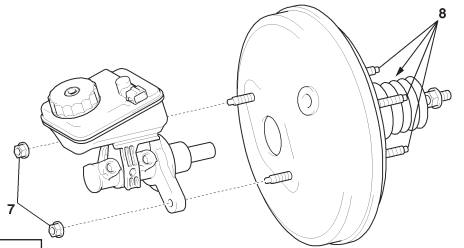
B3F201VD

Tightening torques (m.daN)

Ref.	Description	Tightening
1	Front brake disc	0,5
2	Yoke on brake caliper	3 ± 0,3
3	Brake pipe unions	3 ± 0,3
4	Front brake caliper	8,9 ± 0,9
5	ABS hydraulic valve block support	1,9 ± 0,2
6	Front wheel sensor	0,8 ± 0,1

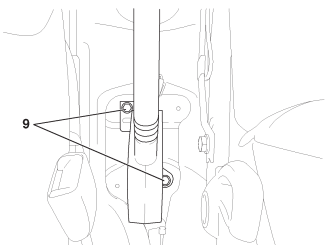
TIGHTENING TORQUES : BRAKES

Front brakes



B3F201XD

Handbrake



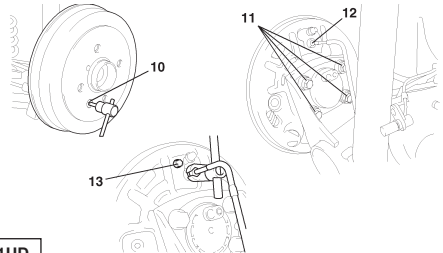
B3F201YD

Tightening torques (m.daN)

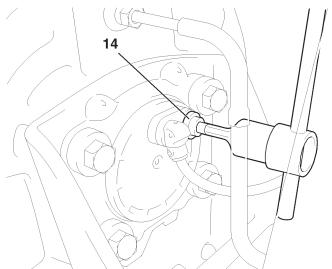
Ref.	Description	Tightening
7	Master-cylinder	**2 ± 0,2**
8	Braking amplifier	**2 ± 0,2**
9	Handbrake lever	**2,2 ± 0,2**

TIGHTENING TORQUES : BRAKES

Rear brakes



B3F201UD

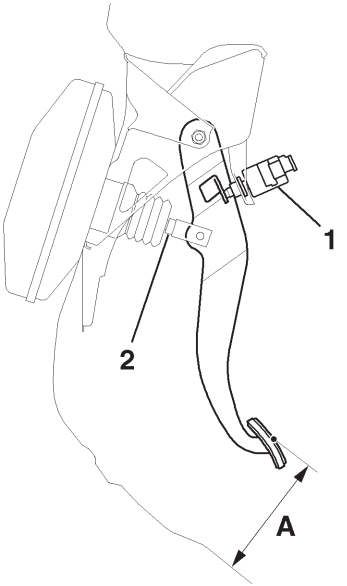


B3F201WD

Tightening torques (m.daN)

Ref.	Description	Tightening
10	Rear brake drum	**0,5**
11	Rear hub support	**5,5 ± 0,5**
12	Brake pipe unions	**1,5 ± 0,1**
13	Wheel cylinder	**0,8 ± 0,1**
14	Rear wheel sensor	**0,8 ± 0,1**

CHECKING THE BRAKE PEDAL



B3F2010D

IMPERATIVE : Respect the safety and cleanliness requirements.

Height **A** of the brake pedal in relation to the floor (engine running) :

135,8 to **145,8 mm** for **left hand drive** models
121,6 to **131,6 mm** for **right hand drive** models

If the pedal height is not correct, adjust it.

Disconnect the connector of the stoplamps switch **(1).**

Unscrew the stoplamps switch **(1).**

Remove the stoplamps switch **(1).**

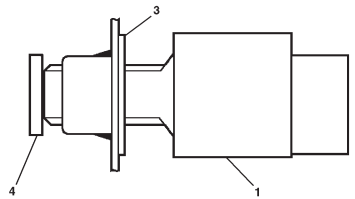
Slacken the push-rod locking nut **(2).**

Adjust the height relative to the floor **A** of the brake pedal by rotating the push-rod **(2).**

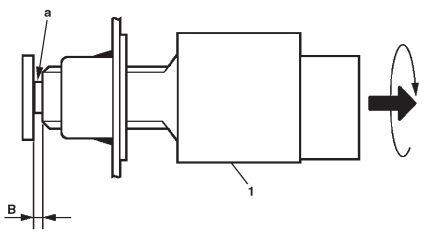
Tighten the push-rod locking nut **(2).**

Tightening torque **: 2,2 ± 0,2 m.daN.**

CHECKING THE BRAKE PEDAL



B3F2011D



B3F2012D

Do up the stoplamps switch **(1)** in its support **(3)** until it is flush with the brake pedal **(4)**.

IMPORTANT : Do not press on the brake pedal.

"a" : shaft.

Make a quarter turn to secure the stoplamps switch **(1)** in place.

IMPORTANT : Do not press on the brake pedal.

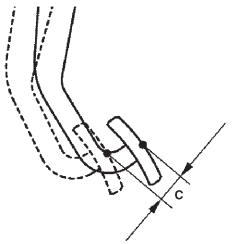
NOTE : Rotational torque for refitting the stoplamps switch **(1) : 0,15 m.daN maximum**.

Check the gap of the stoplamps switch.

B : 1,5 to **2,5 mm.**

Connect the connector of the stoplamps switch **(1)**.

CHECKING THE BRAKE PEDAL



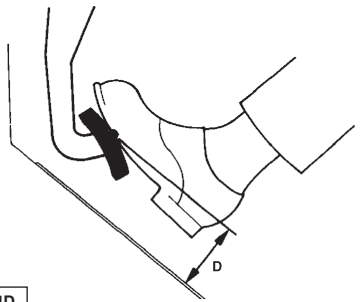
B3F2013D

Press several times on the brake pedal until any vacuum in the braking amplifier disappears totally (engine stopped).

Press on the pedal until you feel the start of resistance. Measure the play as indicated in the diagram.

Play **C** of the brake pedal : **1,0** to **6,0 mm.**

If it is not in conformity, check the braking circuit.
Slacken the handbrake. With the engine running, press on the brake pedal. Measure the reserve travel **D** of the pedal, as indicated in the diagram.



B3F2014D

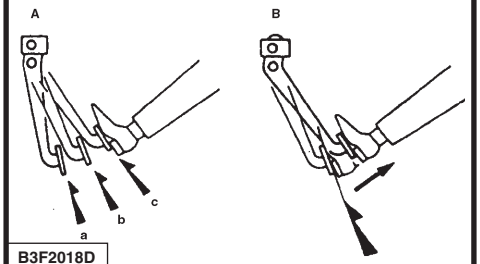
Reserve travel **D** of the brake pedal relative to the floor : more than **48 mm** at **490 N.**

If it is not in conformity, check the braking circuit.
Slacken the handbrake. With the engine running, press on the brake pedal. Measure the reserve travel D of the pedal, as indicated in the diagram.

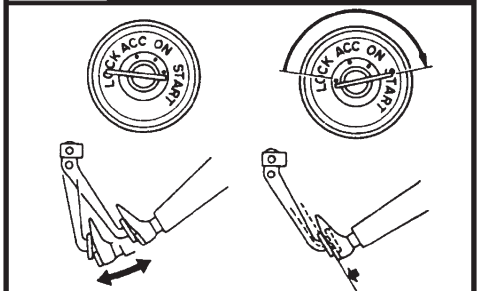
Reserve travel **D** of the brake pedal relative to the floor : more **48 mm** at **490 N**.

If it is not in conformity, check the braking circuit.

CHECKING THE BRAKING AMPLIFIER



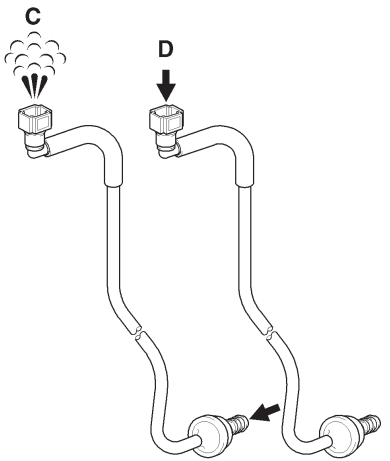
B3F2018D



B3F2019D

IMPERATIVE : Respect the safety and cleanliness requirements.
A : in conformity.
B : not in conformity.
Check the air-tightness.
Start the engine. Stop the engine **1 or 2 minutes** later. Press several times but slowly on the brake pedal.
NOTE : If the brake pedal descends to the floor **"a"** at the 1st press, but does not descend as far as **"b"** at the 2nd press and as far as **"c"** at the 3rd press, the braking amplifier is air-tight.
With the engine running, press on the brake pedal. Keep the pedal pressed down and stop the engine.
NOTE : If the reserve travel does not change after **30 seconds** of keeping the pedal pressed down, the braking amplifier is air-tight.
Check the operation of the brakes.
Ignition switched off, press several times on the brake pedal.
Check the reserve travel of the brake pedal.
Press on the brake pedal and start the engine.
NOTE : If the pedal goes down a few millimetres, it is working normally.
Check the vacuum valve.
Remove the vacuum hose.
Confirm that air is circulating in the direction from the amplifier to the engine, but not in the opposite direction from the engine to the amplifier.

CHECKING THE BRAKING AMPLIFIER



B3F201AD

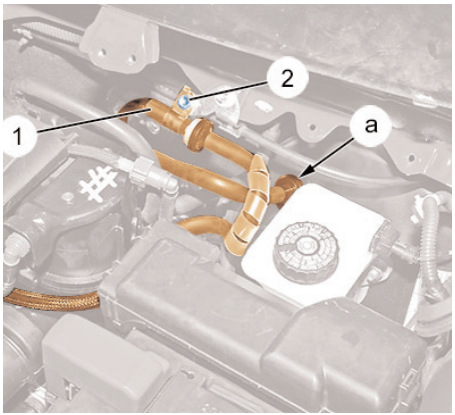
C : circulation of air.

D : absence of circulation of air.

In the event of a fault, replace the vacuum hose.

Refit the vacuum hose.

CHECKING THE VACUUM PUMP



B3F202ED

Tools

[1] Pressure tester **: (-).1602.A Coffret S.1602**
[2] Pressure take-off union **: (-).1602.B**

Checks

Remove :

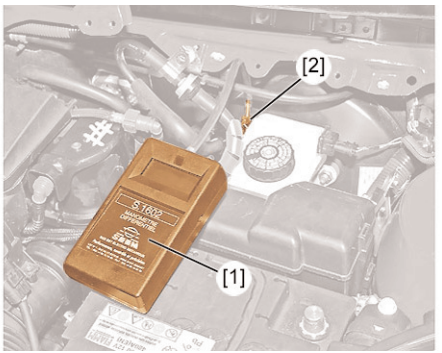
The windscreen wiper arm mounting cap
The windscreen wiper arm
The upper seal between bonnet and scuttle panel
The top scuttle panel ventilation grilles
The wiper motor
The scuttle panel

Locate the vacuum pipe **(1)** between the vacuum pump and the braking amplifier.

Remove the screw **(2)**.

Uncouple the vacuum pipe at **"a"**.

CHECKING THE VACUUM PUMP



B3F202FD

Insert the union **[2]** between the vacuum pump and the braking amplifier.
Connect the tool **[1]** on the union **[2]**.
Run the engine at idling speed.
Check the vacuum value.
Remove the tools.
Uncouple the vacuum pipe at **"a"**.
Refit :
The screw **(2)**
The scuttle panel
The wiper motor
The top scuttle panel ventilation grilles
The upper seal between bonnet and scuttle panel
The windscreen wiper arm
The windscreen wiper arm mounting cap

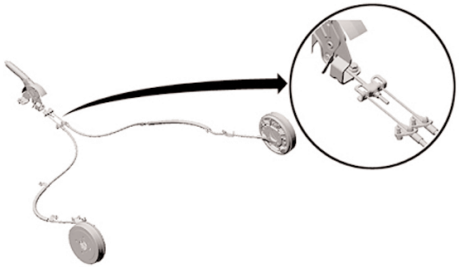
Values to check

NOTE : The vacuum value should be higher than or equal to **0.850 bar.**

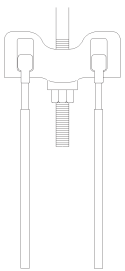
Engine oil temperature	Minimum vacuuml	Maximum time (in seconds) to attain the minimum vacuum
80°C ± 5°C	**500 mbar**	**4,5**
	800 mbar	**18**

If the value is outside the tolerance :
Check the vacuum pump directly.
Check the sealing of the circuit on the link pipes as well as on the braking amplifier.

ADJUSTING THE HANDBRAKE



B3F2021D



B3F200ZD

The handbrake adjustment is under the central console.

IMPERATIVE : Respect the safety and cleanliness requirements.

Adjust the handbrake shoe clearance.
Check the travel of the handbrake lever.
Slowly pull the handbrake lever to the maximum high position, counting the number of clicks.

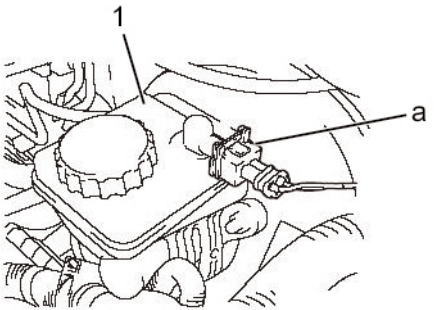
Travel of the handbrake lever : **5** to **8 clicks** at **196 N.**

Remove the central console.
Turn the adjustment nut until the handbrake lever travel corresponds to the value indicated.

Travel of the handbrake lever : **5** to **8 clicks** at **196 N.**

Action the handbrake lever **3** to **4 times** and check its travel.
Check that the handbrake is not rubbing when it is in the released position.
Check that the handbrake warning lamp lights up when the handbrake is applied.
Standard operation: the handbrake warning lamp always lights up from the first click.
Refit the central console

DRAINING, FILLING AND BLEEDING THE BRAKING SYSTEM



B3F202AD

Tools

[1] Generic bleeding apparatus **«LURO»** or similar

IMPERATIVE : Respect the safety and cleanliness requirements.

NOTE : Bleeding of the secondary braking circuit is done with the aid of a diagnostic tool..

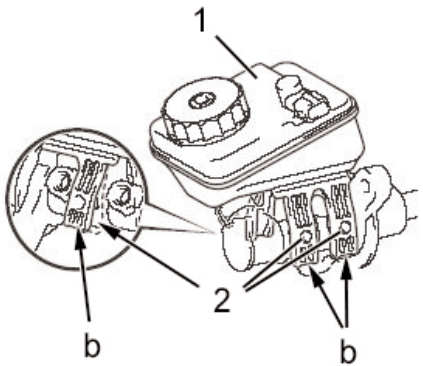
Draining

Disconnect the negative terminal of the battery.

Remove :
The windscreen wiper arm mounting cap
The windscreen wiper arm
The upper seal between bonnet and scuttle panel
The top scuttle panel ventilation grilles
The wiper motor
The scuttle panel

Drain the brake fluid reservoir **(1)** to the maximum
(if necessary, use a clean syringe).
Disconnect the connector at **"a".**

DRAINING, FILLING AND BLEEDING THE BRAKING SYSTEM

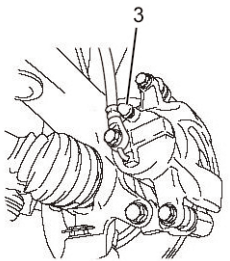


B3F202BD

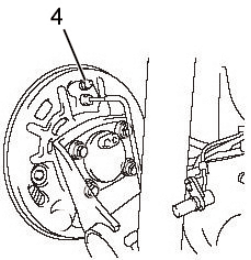
Drain the brake fluid reservoir **(1)** to the maximum
(if necessary, use a clean syringe).
Disconnect the connector at **"a**".
Remove the brake fluid reservoir **(1)**, by moving aside the tabs at **"b"** of the pins **(2)**.
Clean the brake fluid reservoir **(1)**.
Refit the brake fluid reservoir **(1)**.
Reconnect the connector at **"a"**.
Refit : the windscreen wiper arm mounting cap, the windscreen wiper arm, the upper seal between bonnet and scuttle panel, the top ventilation grilles of the scuttle panel, the wiper motor, the scuttle panel.
Reconnect the negative terminal of the battery.
IMPERATIVE : Carry out the operations that are necessary following a reconnection of the battery (see corresponding operation).

Filling the braking circuit
WARNING: Use only the approved and recommended hydraulic fluids.
IMPERATIVE : Only use new brake fluid that has not emulsified; avoid any introduction of impurities into the hydraulic circuit.
Fill the brake fluid reservoir **(1)**.
Bleeding the primary braking circuit
WARNING: During the bleed operations: take care to maintain the level of the brake fluid in the reservoir, keep it topped up.
WARNING: The ABS system must not be in action during the bleed operation.
WARNING: Respect the sequence for the opening of the bleed screws.

DRAINING, FILLING AND BLEEDING THE BRAKING SYSTEM



B3F202CD



B3F202DD

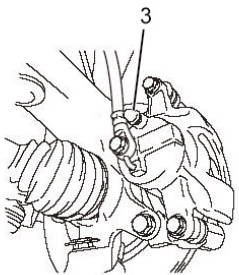
Front brake caliper : Bleed screw **(3)**.
Rear brake caliper : Bleed screw **(4)**.
Bleed each brake cylinder, proceeding in the following sequence :
Front LH wheel.
Front RH wheel.
Rear LH wheel.
Rear RH wheel.

Bleeding the braking circuit with the bleed apparatus

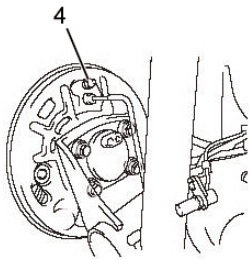
Connect the bleed apparatus **[1]** on the brake fluid reservoir **(1)**.
Adjust the apparatus pressure to **2 bars.**
For each brake circuit:
Couple a transparent tube on the bleed screw.
Submerge the other end of the tube in a clean container.
Open the bleed screw.
Wait until the brake fluid flows out without air bubbles.

Close the bleed screw.
Remove the bleed apparatus **[1]**.
Check the level of the brake fluid (between the « **MINI** » level and the «**MAXI**» level).
Fill if necessary with the the approved and recommended synthetic brake fluid.

DRAINING, FILLING AND BLEEDING THE BRAKING SYSTEM



B3F202CD



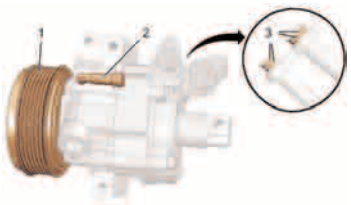
B3F202DD

Bleeding the braking circuit without the bleed apparatus
NOTE : Two operators are necessary.
For each brake circuit:
Apply the brake pedal to place the circuit under pressure.
Couple a transparent tube on the bleed screw.
Submerge the other end of the tube in a clean container.
Open the bleed screw.
Wait until the fluid flows out without air bubbles.
Close the bleed screw.
NOTE : Recommence the process a second time if that is necessary.
Check the level of the brake fluid (between the **«MINI»** level and the **«MAXI»** level).
Fill if necessary with the the approved and recommended synthetic brake fluid.

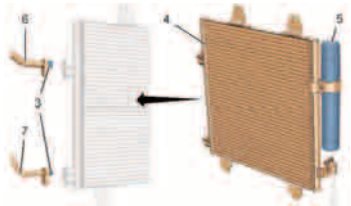
Bleeding the secondary braking circuit
WARNING: During the bleed operations: take care to maintain the level of the brake fluid in the reservoir, keep it topped up.
NOTE : The bleed apparatus **[1]** is still connected on the brake fluid reservoir **(1).**
Use a diagnostic tool.
Select the ABS menu.
Follow the instructions of the diagnostic tool.
At the end of the bleed programme, check the level of the brake fluid, top up if necessary.
Check the travel of the brake pedal: it must not be excessive. If it is, restart the bleed procedure

AIR CONDITIONING R 134 a (HFC)

Vehicule	Engines	Date	Refrigerant refill (± 30 gr)	Compressor		
				Fixed Capacity (fan)	Oil quantity cc	Oil reference
C1	384/F	06/05 ➔	450	VALEO/ZEXEL **DKV-06R**	80	VALEO/ZEXEL **ZXL 200PG**
	DV4TD		500			



C5H2021D



C5H2022D

Compressor/condenser

(1) Air conditioning compressor drive plate.

(2) Connector.

(3) Seals.

(3) Seals.

(4) Condenser.

(5) Filtering cartridge.

(6) Condenser inlet.

(7) Condenser outlet.

SPECIFICATIONS OF AIR CONDITIONING CIRCUIT (R 134.a)

C5H2023D

Pressure reducer

(8) Pressure reducer inlet.
(9) Pressure reducer outlet.
(3) Seals.

Lubricant
WARNING : As these oils have a pronounced tendancy to absorb moisture, avoid stocking them in containers that have been opened.
Type of oil used **: ZXL 200PG.**

IMPERATIVE : Never use any other type of oil.
It is not obligatory to check the level of oil in the compressor when you fill the air conditioning circuit.

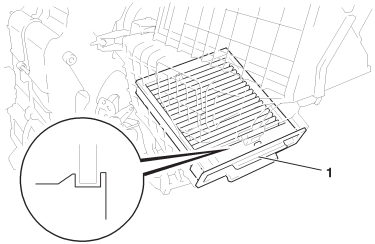
NOTE : The oil level must be checked in cases of leaks in the air conditioning circuit (see corresponding operation).
Pressostat
Linear pressure sensor.
Filler valves
Type of valves : clickfit (with protection cap).
NOTE : The high pressure and low pressure valves have different diameters to avoid any error in fitting.
Seal
O-ring seal.

Pollen filter

C5H202HD

The pollen filter is located in the passenger compartment under the dashboard (on RH side).

Remove the pollen filter **(1).**



C5H202JD

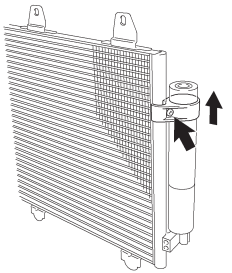
Refitting

Clean the pollen filter housing.

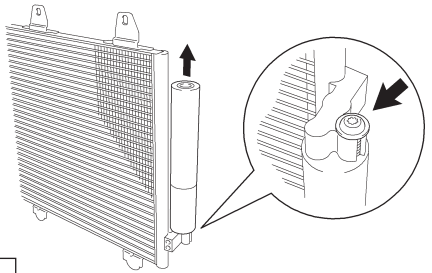
Fit a new pollen filter.

Check the flow of air through the air blower, operating it at its different speeds.

Filtering/drying cartridge



C5H2006D



C5H2007D

Removing

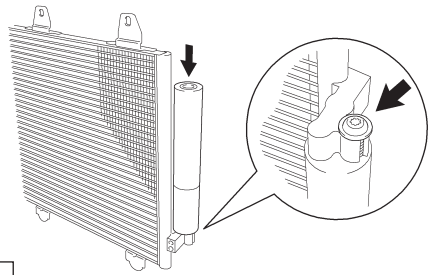
Remove the condenser
(see corresponding operation).

Remove the screw and the support.

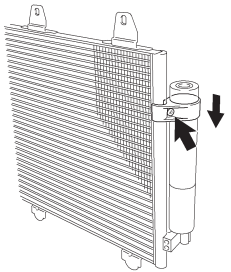
Remove the screw and the filtering/drying cartridge.

Remove the 4 O-ring seals from the condenser.

Filtering/drying cartridge



C5H2008D



C5H2009D

Refitting

Lubricate **4** new O-ring seals, as well as the contact surface of the filtering/drying cartridge, using compressor oil.

Compressor oil **: ZXL 200PG** or equivalent.

Fit the **4** O-ring seals on the condenser.

Refit the filtering/drying cartridge, with the screw.

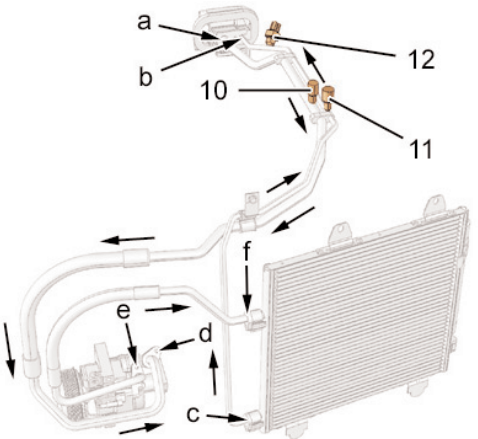
Tightening torque **: 1,3 ± 0,1m.daN.**

Refit the support with the screw.

Refit the condenser (see corresponding operation).

AIR CONDITIONING CIRCUIT R 134.a

Engine : 384F



C5H2024D

(10) Low pressure valve.

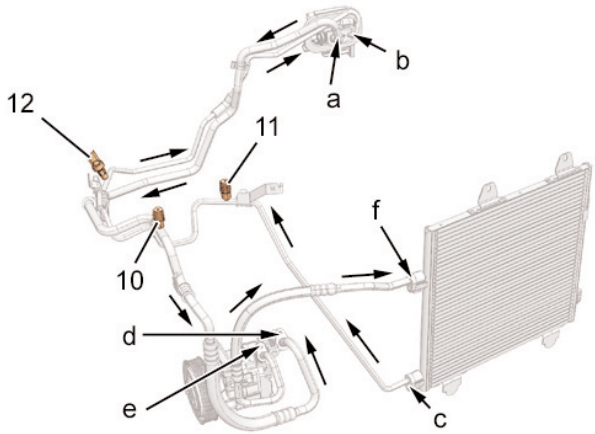
(11) High pressure valve.

(12) Pressostat.

a) Pressure reducer outlet	**: 1 ± 0,1**
b) Pressure reducer inlet	**: 1 ± 0,1**
c) Condenser outlet	**: 1 ± 0,1**
d) Aircon compressor inlet	**: 1 ± 0,1**
e) Aircon compressor outlet	**: 1 ± 0,1**
f) Condenser inlet	**: 1 ± 0,1**

AIR CONDITIONING CIRCUIT R 134.a

Engine : DV4TD



C5H2025D

(10) Low pressure valve.

(11) High pressure valve.

(12) Pressostat

"a" Pressure reducer outlet	**: 1 ± 0,1**
"b" Pressure reducer inlet	**: 1 ± 0,1**
"c" Condenser outlet	**: 1 ± 0,1**
"d" Aircon compressor inlet	**: 1 ± 0,1**
"e" Aircon compressor outlet	**: 1 ± 0,1**
"f" Condenser inlet	**: 1 ± 0,1**